THE IRON TRADE REVIEW

Volume LII CLEVELAND, JANUARY 16, 1913 Number 3

Heavy Buying of Steel Making Pig at Pittsburgh

By Very Important Interests—Foundry Iron Quiet and Some Weakness in South—Unabated Activity in Finished Materials

The pressure for delivery of finished materials continues very strong. Quotations on sheets have been advanced $2 a ton above the prevailing minimum quotations, and, on other steel products, recent prices, including some very high premiums for prompt delivery, are fully maintained. Leading steel makers declare that there is not a defect in the physical and underlying conditions in the industry at present, and they ascribe the current decline in securities to professional manipulation. Although the market is seasonably quieter, there is nothing in sight that indicates any fundamental reaction. Heavy sales of finished materials, particularly plates, shapes and bars, are being made by the larger producers for third and fourth quarters at regular prices, 1.45c, Pittsburgh, and 1.40c, respectively. A car builder in the Chicago district has just placed a contract for material to run through the first quarter of 1914.

Railroad Buying

Indications are that recent buying by the railroads has been heavier than was reported. In the case of the order for the Harriman lines, it is now believed that the order was for more than 20,000 cars, as one builder is said to have received 12,500 cars. Additional financing has just been concluded by the Baltimore & Ohio on a heavy scale and is intended in part to provide for new equipment. The United States Steel Corporation has bought 2,000 cars, divided among the Pressed Steel Car Co., the Standard Steel Car Co. and the American Car & Foundry Co., for its railroads in Minnesota. It has also ordered 13 locomotives. Otis Steel Co. steel has been specified for fire boxes and boilers for the recent large order for locomotives for the Harriman lines.

Imported Free

An order of unusual interest is that placed by the Harlan & Hollingsworth Corporation, with English mills, for several thousand tons of ship building material, under the recent ruling of the United States treasury department admitting free of duty materials for vessels intended for the American merchant marine. The price is understood to have been about equal to that prevailing in the eastern market. Heavy inquiries for structural material for export to England are pending in the east.

Steel-Making Pig Iron

The furnaces of the great steel-making concerns have been under a tremendous pressure, and have been unable to turn out all the pig iron demanded by the steel plants. It is understood that there has already been some heavy buying of Bessemer during the past week and that other important interests will place large tonnages. One Jones & Laughlin Steel Co. furnace has been forced out for repairs, one McKeesport stack of the National Tube Co. is out, and several other Corporation stacks in the Pittsburgh district are not working well. The leading southern maker has sold two lots of 15,000 tons of basic each for second and third quarter shipment to St. Louis territory, at prevailing quotations.

Foundry Pig Iron

Throughout the country, sales of foundry pig iron are on a small scale. On northern iron, prices are being well maintained, but in the south, No. 2 foundry is now being offered by Tennessee furnaces at $13.50, Birmingham, for delivery during the first half of the year, and at $14 by Alabama stacks. These are the prices which prevailed for spot shipment during the latter part of last year. They represent concessions of about 50 cents below the prices then asked for delivery during the first half of this year. On northern foundry irons, there is a disposition to sell for last half delivery at current quotations for first half, and, on the whole, the outlook is that foundry pig iron prices for the last half will not be much, if any, higher than at present. The position of furnaces in the central west is, however, strong, as stocks have declined sharply during the past month and additional furnaces are not likely to blow in unless coke prices decline. There is heavy inquiry for foundry iron before southern makers, aggregating about 60,000 tons, for export to Italy, Austria and other European countries.

PITTSBURGH

Strong Pressure for Deliveries---Sheets Advance

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Jan. 14.

Many mills have experienced a marked decrease in new orders, but there is no let-up in demand for delivery of material. In almost every instance, specifications exceed contracts, and the most important question with manufacturers is that of deliveries. Despite the fact that many mills in this city, Wheeling, W. Va., and in towns along the Ohio river, were forced to shut down last week on account of floods, pressure for semi-finished steel did not fall off. The demand for sheets and the high price of raw material have caused makers to advance quotations $2 a ton, although new prices will not become effective until next summer, as most mills have sold practically their entire output through the first half of the year.

Several quiet transactions for steel-making iron have been closed this week at prevailing market prices. The coke market has been quiet, and, if anything, slightly lower prices than those which prevailed a week or two ago are now ruling. Fabricators continue to receive good inquiries and a number of important contracts have been taken.

Pig Iron.—Several lots of steel-making iron have been sold this week at prevailing market quotations. Early in the week, one of the local consumers closed for about 2,000 tons of Bessemer pig iron at substantially $17.50, valley, and several other small lots have been sold at that figure. Rather heavy tonnages of Bessemer and basic have been obtained through local pig iron interests, although no information relative to the exact amount and the price is available.

One of the local steel foundries closed for a tonnage of basic, early last week, at $17.25, Pittsburgh. Complaint about the so-called "unreasonable" price of coke is heard, it being claimed that today's price of pig iron does not warrant $3.50 for contract furnace coke. We quote all grades for first half delivery as follows:

(First Half.)

Bessemer, valley	$17.25 to 17.50
Bessemer, Pittsburgh	18.15 to 18.40
Basic, valley	16.50
Basic, Pittsburgh	17.40
No. 2 foundry, valley	17.50
No. 2 foundry, Pittsburgh	18.40
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.25 to 16.50
Gray forge, Pittsburgh	17.15 to 17.40

Ferro-Alloys.—Eighty per cent ferro-manganese, for prompt delivery, showed somewhat surprising weakness during the middle of last week, when several carloads sold as low as $65, seaboard, $10 under the prevailing market price for some time. The low priced material was the result of middlemen accumulating small surplus tonnages on last half shipments and only a limited amount of this alloy will be sold at $65.

The market for forward delivery has showed no weakness and it is probable that the market for prompt delivery will readjust itself within a week or 10 days. Fifty per cent ferro-silicon continues to be quoted at $75, Pittsburgh, for both prompt and forward delivery.

We quote 80 per cent ferro manganese at $65 to $75, Baltimore, for prompt delivery and $65 to $70 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Demand for steel plates continues at a heavy rate and the most important question with makers is that of delivery. As reported from other districts, there is no let-up in the car buying. Eastern roads, in particular, continue to figure prominently along this line. Steel plates continue to demand high price for prompt delivery. Prices follow:

Standard steel plates ¼ inch thick. 6¼ to 100 inches, 1.45c to 1.60c for forward shipment and 1.65c to 1.90c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—Demand on the part of consumers has forced several interests to advance quotations $2 a ton above the prevailing minimum quotations which became effective Oct. 10, 1912, when all grades of sheets were advanced $2 a ton. Consumers have been able to cover needs at what have been prevailing minimum prices for a period of nine months, as all manufacturers offered these prices through the first half of the year. Several independent mills advanced quotations $2 a ton three or four weeks ago, and the leading interest adopted maximum quotations today.

A number of makers of wrought iron galvanized and painted sheets readjusted prices the first of the year, showing advances of $1 and $2 a ton in galvanized wrought iron products and a $1 decrease in painted wrought iron products. Inasmuch as wrought iron sheets are considered a specialty, this re-adjustment is of little importance. We now quote No. 10 gage, blue annealed sheets at $1.75; No. 28 gage, black sheets, $2.35, No. 28 gage galvanized sheets, $3.50, for forward delivery; mills in a position to furnish prompt material are enjoying fancy prices. Other quotations follow:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $2.00 per 100 pounds; Nos. 13-14 gage, $2.05; Nos. 15-16 gage, $2.10; Nos. 17-21 gage, $2.15; Nos. 22-24 gage, $2.20; Nos. 25-26 gage, $2.25; No. 27 gage, $2.30; No. 28 gage, $2.35; No. 29 gage, $2.40; No. 30 gage, $2.50.

Tin mill sizes, Nos. 15-16 gage, $2.10 per 100 pounds; Nos. 17-21 gage, $2.15; Nos. 22-24 gage, $2.20; Nos. 25-27 gage, $2.25; No. 28 gage, $2.30; Nos. 29-30 gage, $2.35; Nos. 30½-31 gage, $2.40; No. 32 gage, $2.45.

Blue Annealed.—Nos. 3-8, $1.70 per 100 pounds; Nos. 9-10, $1.75; Nos. 11-12, $1.80; Nos. 13-14, $1.85; Nos. 15-16, $1.95.

Galvanized.

Nos. 10-11 gage, $2.50 per 100 pounds; Nos. 12-14 gage, $2.60; Nos. 15-16 gage, $2.75; Nos. 17-21 gage, $2.90; Nos. 22-24 gage, $3.05; Nos. 25-26 gage, $3.20; No. 27 gage $3.35; No. 28 gage, $3.50; No. 29 gage, $3.65; No. 30 gage, $3.80.

Roofing Sheets

Net extras on all gages per 100 pounds.

Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—Heaviest consumers of tin plate have covered requirements for 1913, and the market has been quiet during the last fortnight. With semi-finished steel products and tin selling at high prices, tin plate manufacturers claim there is but small profit in that branch of the trade. The prevailing price is:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—Specifications against contracts for steel

rails continue at a heavy rate and all of the mills in this district are operating at maximum capacity. Although traction line interests have not yet covered 1913 needs, there is indication that requirements are being seriously considered at this time, and it is probable that heavy tonnages will be booked in the near future. Standard spikes continue to be quoted at a spread from 1.90c to 2c; angle bars at 1.50c, for base size, and track bolts at 2.40c to 2.50c, base. We quote rails as follows with the base price of open-hearth steel sections at 1.34c per pound at the mill.

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	1.90c to 2.00c
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4¼ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars. — Although no definite information is available, it is understood that several quiet sales of semi-finished steel products have been made this week at 50 cents and $1 a ton above prices nominally representing the market a week ago. Bessemer billets have been sold at $28.50, Pittsburgh, open-hearth billets at $30, and open-hearth sheet bars at $31, Pittsburgh, according to reliable information.

The scarcity of semi-finished steel is acute and has resulted in considerable embarrassment on the part of consumers. Despite the fact that numerous plants were forced to close down last week on account of floods, no let-up in demand for steel was experienced. Revised quotations follow:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $28.50, with the usual extra for size and analysis, and open-hearth rolling billets, $29.00 to $29.50. Bessemer sheet and tin bars are quoted at $29.00 and open-hearth sheet bars are quoted $29.50 to $30.00, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $35.00 to $36.00, Pittsburgh.

Hoops and Bands. — Specifying against contracts for hoops and bands continues at a heavy rate and there has been some new demand. The steel hoop classification adopted by the Carnegie Steel Co., mentioned in last week's issue of The Iron Trade Review, is being accepted by other interests. Steel hoops are quoted at a range from 1.60c to 1.70c and bands at a spread from 1.40c to 1.45c.

Hoops in carload lots, 1.60c to 1.70c, Pittsburgh, in less than carload lots, 1.65c to 1.75c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—The bi-monthly examination of sale sheets of union mills in the central west, Jan. 10, showed the average realized price of 1.40c, which entitles puddlers belonging to the Amalgamated Association of Iron, Steel and Tin Plate Workers $6.45 a ton, which is 30 cents a ton above the rate paid the last two months. Amalgamated Association members are enjoying better prices than puddlers identified with the United Sons of Vulcan, who obtained a flat $6 a ton rate last summer.

Nearly all steel bar makers have sold material for delivery through the entire year and several interests will be out of the market until buying begins for the first quarter of 1914. Although there has been a marked decrease in new orders, specifying has not fallen off to any extent. Without exception, mills in this district have filled contracts taken below the 1.40c base.

Iron bars continue to be quoted at a range from 1.70c to 1.80c and makers advise that there is no let-up in conditions. Manufacturers of cold rolled shafting are now uniformly quoting this product at 58 per cent off the official list for carloads and 53 per cent off for less than carloads. Prices are:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 58 per cent off in carloads and 53 per cent in less than carloads delivered in base territory.

Muck Bar.—It is understood that several offers of muck bar have been made in the past week at $32, Pittsburgh, although it is not known that any sales have resulted. We continue to quote muck bar at $32, Pittsburgh.

Bolts, Nuts and Rivets.—Manufacturers of bolts, nuts and rivets continue to enjoy what appears to be a healthy demand, and shipments are as badly deferred as they have been the last couple of months. There is some indication of a change in the price of rivets. We quote:

Rivets

Button head structural rivets, 2.20c, cone head boiler rivets, 2.30c. Small rivets 75, 10 and 10 off.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½ inch and smaller, $7.20 off.

Structural Shapes.—The Jones & Laughlin Steel Co. has taken a contract for 600 tons of fabricated steel for the City Bank & Trust Co.'s 10-story building at Mobile, Ala. Bids on the Reibold 11-story building, Dayton, O., involving 1,700 tons of fabricated steel, were closed Jan. 14. The contract for the Pennsylvania Railroad Co.'s bridge at Sheridan, Pa., 6,600 tons, has not yet been closed. Demand for structural material continues heavy and there is no change in quotations.

Standard structural shapes, 1.45c to 1.60c for forward shipment. For extras see card of Sept. 1, 1909.

Iron and Steel Pipe.—A number of large contracts for iron and steel pipe have been taken by mills in this district during the past week, and considerable inquiry is reported. Local gas companies during the past week have closed negotiations for the following: 12 miles of 6-inch; 16 miles of 2-inch; 5 miles of 10-inch; 3 miles of 8-inch; 3½ miles of 4-inch, and 1 mile of 3-inch, all of which will be shipped to West Virginia points. Orders were distributed generally among makers in this district.

Demand for oil country goods has been particularly heavy. An inquiry for 5 miles of 2-inch pipe for West Virginia shipment was received several days ago. Negotiations for 180 miles of 12-inch pipe, mentioned previously by THE IRON TRADE REVIEW, have not yet been closed. Iron and steel pipe of jobbers is quoted as follows with the usual preferential discount to the large buyer:

Iron and Steel Pipe Basing Prices.

IRON.

⅛ inch	66	47	..	..
¼ inch	70	57	..	..
⅜ to 2½ inch	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch	..	..	71	62
7 to 12 inch	..	..	69	56

Extra Strong Plain Ends, Card Weight.

⅛ inch	64	53	..	..
¼ inch	68	61	..	..
⅜ to 1½ inch	72	63	..	..
2 and 2½ inch	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch	..	..	71	62
4½ to 6 inch	..	..	70	61
7 to 8 inch	..	..	64	54
9 to 12 inch	..	..	59	48

Double Extra Strong Plain Ends, Card Weight.

½ inch	58	50	..	..
¾ to 1½ inch	61	53	..	..

2 and 2½ inch.....	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch.....	..	..	61	55
4½ to 6 inch.....	..	..	60	54
7 and 8 inch.....	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—Letters received by The Iron Trade Review from manufacturers of iron boiler tubes indicate that the new classification printed in full in the Jan. 9 issue has become general. Demand for both iron and steel boiler tubes continues rather heavy. The following discounts to jobbers prevail:

IRON AND STEEL BOILER TUBES BASING PRICES

(To Jobbers.)

	Steel.	Iron.
1¼ and 2 inch.....	61	48
2¼ inch	58	44
2½ and 2¾ inch.....	64	53
3 and 3¼ inch.....	69	55
3½ to 4½ inch.....	71	58
5 and 6 inch.....	64	..
7 to 13 inch.....	61	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths. f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—There has been some new demand for wire products the last week or 10 days, and there is no indication of any difficulty being experienced in establishing nails at $1.75 and plain wire at $1.55. Specifying continues liberal and heavy shipments are being made to all parts of the country. There has been no change in the price of cut nails. Prices follow:

Wire nails, jobbers' carload lots, $1.75, retailers' carload lots, $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.75; retailers' carload lots, $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.55; and to dealers, in carloads, $1.60; polished staples, $1.75; galvanized staples, $2.10.

Wire Rods.—Little or no inquiry is reported for wire rods. Several makers advise that they would not offer these products at $30, Pittsburgh, although in the absence of sales, we continue to quote the market nominally at that figure.

Coke.—The coke market has been rather quiet and the expected shortage, which many feared a few weeks ago, has not yet come. Consequently the market has not advanced as high as many believed. Considerable complaint is heard from blast furnace interests on account of the so-called "unreasonable" price of furnace fuel, both for future and prompt delivery. Predictions of decreases in price are heard frequently. Spot furnace fuel this week sold at a range from $4 to $4.10, ovens. There is no change in the contract market.

Prompt foundry coke has been selling at about $4.50, ovens, although some dealers claim that they have been able to sell at $4.75, ovens. The contract market, however, is represented by the $4 quotation, rather than by a spread from $4 to $4.25, ovens. The Connellsville *Courier*, for the week ending Jan. 4, says productions was 384,204 tons, a gain of 25,199 tons over the week before. Shipments increased 762 cars. Revised quotations follow:

Connellsville furnace	$4.00 to 4.10
Connellsville furnace contract.....	3.25 to 3.50
Connellsville foundry	4.50 to 4.75
Connellsville foundry contract....	4.00

Old Material.—The market for iron and steel scrap has offered but a single feature this year, namely, a period of unusual quiet and inactivity. Dealers advise trouble is being experienced in selling stock even at minimum quotations, although prevailing prices have not been shaded so far as can be learned. Heavy melting steel continues to be quoted at a range from $15 to $15.25, although not much stock has been sold this week. There is an embargo against the Monessen plant of the Pittsburgh Steel Co. For the first time in almost a half year, we make no change in our quotations, which follow:

Heavy melting scrap.....	$15.00 to 15.25
Rerolling rails	16.50 to 17.00
Malleable	14.00 to 14.50
Agricultural malleable	13.50 to 13.75
Bundled sheet scrap.....	13.00 to 13.25
Iron axles	26.00 to 27.00
Old iron rails	16.75 to 17.25
Stove plate	11.50 to 12.00
No. 1 wrought scrap.....	15.25 to 15.50
Old car wheels.....	16.25 to 16.50
Low phosphorus	18.00 to 18.50
Machine shop turnings.....	10.50 to 10.75
No. 1 busheling.....	14.25 to 14.50
Country mixed	11.00 to 11.25
Cast borings	10.25 to 10.50
No. 1 cast scrap.....	14.50 to 14.75

Puddling Wage Advance

The regular bi-monthly wage settlement between representatives of the Amalgamated Association of Iron, Steel and Tin Workers, the Republic Iron & Steel Co. and the Western Bar Iron Association, was made at Youngstown last week. The average realized price on base sizes of iron bars shipped from selected mills in November and December was found to be slightly more than 1.40c, compared with 1.3351c for the previous period. The puddling rate advances from $6.15 a ton to $6.45 a ton. The Sons of Vulcan are operating on a straight $6 rate.

The production of pig iron in Germany during 1912 amounted to 17,852,500 tons, an increase over the previous year of 2,299,500 tons.

RESUME HEARINGS

Before Commerce Commission on Complaint Against Ore Rate.

Hearings were resumed before the Interstate Commerce Commission at Washington, Jan. 13, on the complaint of the Youngstown Sheet & Tube Co. against the lake iron ore freight rates from Lake Erie ports to the campany's plant. The witnesses were A. M. Schoyer, for the Pennsylvania system; H. B. Reinsagen, for the Lake Shore; and R. M. Begien for the Baltimore & Ohio. They were put on the stand to testify to the value of the ore handling plants at Erie, Ashtabula, Cleveland and Lorain.

Mr. Schoyer estimated that it costs his company 26.2 cents per ton to handle ore from the ships to the cars, including 11 cents per ton paid to the stevedore companies that actually operate the machines owned by the carriers. He claimed that the company's investment at Erie, Ashtabula and Cleveland is more than $7,000,000. Mr. Reinsagen, claiming to use actual cost figures, put the cost at 26.92 cents, and Mr. Begien at 22.06 cents. The figures of the last-mentioned witness provoked smiles of incredulity among the other statisticians who claim that the Baltimore & Ohio has the least economical plant and should, therefore, have a higher cost than any of the other carriers.

At the Tuesday session, W. P. Orr and F. H. Large went on the stand for the Pennsylvania lines, J. Nessle and Henry Bromly for the New York Central, and H. M. Matthews for the Baltimore & Ohio. A large amount of statistical information was filed by the witnesses, showing the average distance hauled to blast furnaces, the rate per ton per mile and the proportion of the traffic which the ore, coal and coke shipments bear to the whole traffic, and other information.

Contracts Taken.—The Blaw Steel Construction Co., Westinghouse building, Pittsburgh, with plants at Reynoldsville and Hoboken, Pa., has recently taken the following contracts: Three thousand tons of galvanized transmission towers for the Pearson Engineering Corporation of New York, for shipment to Spain; 200 tons of galvanized transmission towers for Stone & Webster Engineering Corporation, for shipment to Keokuk, Iowa; two steel viaducts for the West Penn Railroad Co., near Scottdale; steel form contract for the New York subway construction; steel form contract for the Pennsylvania railroad bridge near Baltimore.

CHICAGO

Southern Pig Weakens---Mill Activity Continues

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Jan. 14.

The leading independent producer in this territory has sent out letters cancelling unspecified tonnage on a large number of terminated contracts for finished materials, but has received replies objecting strenuously to this course and enclosing the required specifications. This indicates that the contract tonnage on mill books is speculative in a very slight degree. Activity in all finished lines is being maintained at about the rate established in December, and while some diminution in activity is apparent, the expected lull is far less pronounced than is usually the case at this time of the year. The bar iron market is very strong, existing conditions being almost parallel to those obtaining in other finished lines. This is noteworthy, as delivery can usually be had on this material in from four to six weeks.

Pig Iron.—Despite reports of a willingness to shade prices on the part of some southern producers, the market is fairly firm, and although comparatively quiet, some fairly good inquiries have appeared. These include 1,500 tons of southern iron for delivery during the next four months and 250 tons for delivery in the second quarter. Another inquiry for 500 tons is reported, and it is understood that a lot of 500 tons was sold for first quarter delivery on the basis of $14.50, Birmingham. These indications of a spot demand are further substantiated by sales of car load lots totaling in the neighborhood of 200 tons at $14 or better. Some sales below $14 have been reported, however, and a Tennessee furnace is offering iron on a basis of $13.50, Birmingham, for first half delivery. One of the largest southern producers reports a very small tonnage available for the entire first half, which will be distributed among customers for as wide a delivery as possible.

Northern iron continues to be quoted at $18, local furnaces. One Chicago furnace interest is entirely sold up for first quarter, and would be behind on iron for that delivery even if no off iron was made. This seller has some available tonnage for second quarter and is disposed to hold firmly to current quotations. Attempts have been made to induce customers consuming 6,000 tons or more a month to release a part of that tonnage, but they have refused, saying all of the iron will be needed. There is considerable demand for malleable and negotiations involving a total of about 10,000 tons are under way. Other sales of northern iron in this territory include a lot of 500 tons, two of 200 tons and one of 300 tons at current quotations.

There seems to be a fair demand for charcoal iron among malleable foundries and car builders, the latter being unable to secure sufficient old car wheels. Charcoal quotations to this territory now range from $18.25, Chicago, for No. 2 foundry, to $19.75 for AA Scotch.

The following quotations represent the market for Chicago delivery except malleable Bessemer and northern foundry which are quoted f. o. b. furnaces:

	First half.
Lake Superior charcoal	$18.25 to 19.25
Northern foundry No. 2	18.00
Southern foundry No. 2	17.85 to 18.85
South'n Silveries, 5 per cent sil.	19.85
Jackson co. silv'r's 8 per cent	21.90 to 22.40
Malleable Bessemer	18.00
Alabama basic	18.85

Merchant Bars.—Iron bars are now quotable at from 1.60c to 1.62½c, Chicago. Specifications for this material are being maintained at about the rate established during December and the delivery situation grows worse daily. Good tonnages to large consumers have recently been sold at 1.60c, with no difficulty, and other lots carrying heavy extras have been placed at the same price. There is no apparent diminution in activity in soft steel bars and mills rolling hard steel bars find it somewhat easier to obtain material, as railroad scrap lists recently issued have carried a good tonnage of re-rolling rails.

We quote, f. o. b. Chicago, as follows:

Bar iron 1.60c to 1.62½c; hard steel bars, rerolled, 1.65c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—In spite of the continued difficulty in obtaining prompt delivery of shapes, structural lettings continue very good, as the larger contractors are well covered for their requirements. The total placed during the past week amounts to 4,574 tons, of which the leading interest has taken 1,685 tons for the Metropolitan building, Los Angeles, and 229 tons from the Tidewater Southern Railway Co., for bridges in California. The Minneapolis Steel & Machinery Co. has taken 1,300 tons from the Portland Trust Co., Portland, Ore., for a 12-story building in that city, and 215 tons from the Mead-Morrison Mfg. Co., for a coal handling bridge. The Denver & Rio Grande Railroad Co. has let a contract to the Milwaukee Bridge Co., for a viaduct in Utah. A contract for 682 tons of structural material to be used in the erection of the Carlston-Snyder building, Oakland, Cal., has been let to the Dyer Bros.

One of the independent producers in this territory has endeavored to cancel some unspecified tonnages for shapes, but consumers have strenuously objected to this and sent in the specifications. Prices remain firmly at the same level and it is thought that no great advances will be made during the coming year unless unusual conditions arise.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—Evidences of additional rail buying in this market are appearing and specifications against contracts are exceedingly heavy. This applies in an

equal degree to track fastenings, and while producers are able to keep up on deliveries on specifications, on new business two months is the best that can be done. While this period is considerably better than any delivery that can be made on other finished lines, it is unusual for this material on account of the great capacity in this territory. The Chicago, Indianapolis & Louisville has ordered 4,000 tons of rails from the Illinois Steel Co.

We quote light rails f. o. b. Chicago, and track fastenings f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspection.

And track fastenings, f. o. b. Joliet, as follows:

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—In spite of the fact that car builders now have sufficient business on their books to run into 1914, some additional orders have been placed and large inquiries are in the market. The Norfolk & Western is inquiring for 1,250 freight cars and the Chicago, Milwaukee & St. Paul is figuring on over 6,000 freight cars. The Fort Dodge, Des Moines & Southern is in the market for 200 box cars and the American Refrigerator Transit has ordered 1,000 refrigerator cars from the American Car & Foundry Co. The New York Central Lines have placed an order for 1,000 box cars with the same builder for use at Cleveland, Cincinnati and St. Paul. Although mill congestion on plates does not approach that which exists on structural material, many additional car orders will go a great way toward filling the mills for the entire year. There is much tonnage for second half still available, however, as the leading independent producers in this territory as well as eastern sellers have been earnestly endeavoring to keep away from second half business. Some tonnage has been forced on them, however, by old customers, and it is possible that the third quarter capacity will be exhausted by the overflow from the first half.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—Demand for this material is keeping up at a higher rate and the lull which was expected in some quarters after the first of the year has not fully materialized. Quotations are very strong, particularly as to structural rivets, for which there seems to be a good demand.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.38c, base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅜ x 6 inches, rolled thread, 75-10; larger sizes, 70-2½.

Machine bolts, up to ⅜ x 4 inches, rolled thread, 75-10-5; cut thread 75-10; larger sizes, 70-7½.

Hot pressed nuts, square head, $5.70 off per cwt.; hexagon, $6.30 off per cwt.

Sheets. — About the same rate of activity is being maintained in the sheet market as that noted during the previous week. Prices are very firm and specifications continue at a rate which promises to make the unfilled tonnage on the first of July very heavy.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products. — Spring activities appear to be anticipated in some degree by many buyers, as it is reported that jobbers are taking on additional stocks. Agricultural interests are specifying liberally and further buying toward the end of the first quarter is expected. Prices are very firm at current quotations.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03; painted barb wire, jobbers' carload lots, $1.93; retailers' carload lots, $1.98; retailers' less than carload lots, $2.03, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.73; retailers' carload lots, $1.78.

Merchant Pipe and Tubes.—The market for this material reflects the conditions apparent in other finished lines and makers are looking forward to a year of prosperity equal to if not greater than the one just closed.

We quote, f. o. b. Chicago, as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	42.2
⅜ inch	73.2	62.2	66.2	....
½ inch to 1¼ inch.	76.2	67.2	69.2	57.2
Lap.				
2 inch	73.2	64.2	65.2	54.2
4½ inch to 6 inch..	75.2	66.2	67.2	57.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	65.2	54.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	58.2	46.2
½ inch	69.2	57.2	63.2	51.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	64.2	52.2
7 inch to 8 inch....	64.2	52.2	58.2	46.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	48.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2½ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—The only material tonnage noted as pending is required by Detroit, and consists of 3,827 tons of water pipe. Bids on this will close today. A pipe contract has been let by Burlingame, Kans., for 350 tons of pipe mentioned last week. While some unusually good tonnages should appear in the near future, no other material inquiries have been sent out.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $31, 6 to 12 inches, $29, larger sizes, $28, gas pipe, $1 a ton higher.

Old Material.—An unusually large number of railroad lists covering heavy tonnages have been sent out during the past ten days or two weeks, and in consequence, old material is weak. Consumers have very heavy stocks, in some instances approaching the limit both from a financial and a physical standpoint, and in consequence it is very difficult to place any material tonnage even at very low prices. It is understood, however, that dealers have taken the larger part of the railroad offerings. The general weakness is not apparent to so great an extent in old car wheels and rerolling rails, but the situation as regards the latter is much easier. Recent lists have included good tonnages of rails and a list issued by the B. & O. offers 4,000 tons of No. 1 rails which should be readily absorbed in this territory. This list totals about 17,000 net tons and also includes 2,000 tons of No. 1 railroad wrought.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$16.75 to 17.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.25 to 16.75
Old steel rails (3 ft. and und.)	14.50 to 15.00

Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	12.75 to 13.25
Shoveling steel	12.50 to 12.75

Net Tons

No. 1 R. R. wrought	$12.75 to 13.25
No. 2 R. R. wrought	12.25 to 12.75
Arch bars and transoms	16.50 to 7.00
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.75 to 17.25
Iron car axles	21.50 to 22.00
Steel car axles	18.25 to 18.75
Locomotive tires	13.50 to 14.40
Dealers forge	10.75 to 11.25
Pipe and flues	9.75 to 10.25
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.25 to 11.75
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	9.25 to 9.75
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.25 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.50 to 14.00
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

CLEVELAND

More Interest in Last Half Iron

Office of THE IRON TRADE REVIEW, Penton Bldg., Jan. 14.

Iron Ore.—There is very little activity in the iron ore market at present. While a large percentage of the high grade ores has been sold, a great deal of the low grade ores has not been disposed of. Many merchant furnaces, particularly those in eastern territory, continue to show a disposition to await developments in the business world before covering for their full requirements.

Some lake ore is still being offered to vesselmen, but free tonnage is not plentiful and there were few takers in Cleveland this week. One firm operating a number of vessels, is in the market to charter outright for a lump sum, operating the vessels as a part of its own fleet. A deal of this sort may be put through.

There is no change in the Lake Michigan situation, but it will not be long now before the shippers will have to enter the market for tonnage.

The lake coal trade during 1912 was a surprise. Vessels seemed to be knocking about the ports all summer unable to get cargoes and yet the movement was the heaviest on record. Soft coal shipments totaled 23,500,000 tons and hard coal shipments 4,204,741 tons.

The ship yards of the great lakes have 52 vessels under construction for 1913 delivery, of which 24 are intended for coast service. The list includes seven bulk freighters, three passenger steamers, two package freighters, three oil steamers, three oil barges, one car ferry, 15 coal barges (for Black Warrior river), three lighters, nine dredges, one floating dry dock, one lighthouse tender, one tug, one tunnel launch, one machine boat and one scow.

During 1912 lake ship yards, exclusive of Canadian yards, launched 35 vessels, including 11 bulk freighters (six for the coast), six package freighters (three for the coast), three oil barges for coast service, three passenger boats, one conveyor boat, one sand steamer, one oil steamer, two scows, one car ferry, two tugs, one bridge pontoon, one floating dock, one barge and one sternwheel steamer for Kootenay lake.

The average ore cargo carried in the lakes during 1912 was 7,740 tons.

The average stay at upper lake ports of the vessels of the Pittsburgh Steamship Co. during 1912 was 20 hours and 9 minutes, and at lower lake ports 11 hours and 51 minutes.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40.

Pig Iron.—More interest is being shown in pig iron for delivery during the last half of this year, but very few sales have been made. Some furnaces have quoted current prices for last half delivery, while others are not willing to make quotations at the present time on that basis. Buying of moderate tonnages for prompt delivery to foundries in Cleveland and vicinity continues. For delivery during the first half of this year, we quote as follows, delivered Cleveland:

No. 1 foundry	$18.25 to 18.75
No. 2 foundry	17.75 to 18.00
No. 2 southern	17.85 to 18.35
Bessemer	18.15 to 18.40
Lake Superior charcoal	19.10 to 19.75
Silveries 8 per cent silicon	21.55
Bessemer ferro, 14 per cent	29.55

Coke.—Coke is firm, and, while there is no great activity, the demand is not such as to warrant the expectation that prices will be lowered. We quote:

Connellsville furnace coke, $4.00 to $4.15 for prompt delivery, and $3.25 to $3.50 on contract; Connellsville foundry coke, $4.50 to $4.65 for prompt, and $4.00 to $4.25 on contract.

Finished Material.—Many users of finished material are applying for requirement contracts, but find the steel companies very cautious about taking on additional tonnages. The best delivery now promised on structural material by the leading interest is last quarter, and it is difficult to obtain much better delivery from independents except at premium prices. An eastern Pennsylvania steel company is quoting as high as 1.75c, at its mill, for structural material for delivery within five or six weeks. Among the railroad inquiries pending is one from the Lake Shore for 400 tons, half of which is nickel steel for a bridge over the Rock Island tracks at Chicago. An addition to the Reibold building, Dayton, calling for 1,700 tons, is about to be placed. It is expected that the 8,000 tons required for the Central avenue bridge will be placed in the spring.

Old Material.—The scrap market is featureless, being very quiet. Dealers' stocks are in fair shape and demands are being awaited for a period of activity, the time of which is declared to be indefinite. Prices are nominal. They follow:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.25 to 16.75
Relaying rails	25.00 to 26.00
Old steel boiler plate	11.50 to 12.00
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	13.25 to 13.75
Country mixed steel	11.00 to 11.50
Bundled sheet scrap	11.50 to 12.00

Net Tons.

No. 1 R. R. wrought	$14.00 to 14.50
No. 1 busheling	12.00 to 12.50
No. 1 machine cast	13.50 to 14.00
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	7.75 to 8.00
Pipes and flues	10.00 to 10.50
Wrought drillings	7.75 to 8.00
Cast borings	7.50 to 7.75
Stove plate	10.50 to 11.00
Wrought iron arch bars	17.00 to 17.50
Wrought iron piling plate	16.00 to 16.50

Foundry Is Bankrupt.—The Chelnesford Foundry Co., Medford, Mass., has been petitioned into bankruptcy by three creditors representing claims of $7,250. The company admits its inability to pay its debts and is willing to be adjudged a bankrupt.

PHILADELPHIA

Finished Lines Active---Pig Iron Buying Slow.

Office of THE IRON TRADE REVIEW,
Philadelphia, Jan. 14.

With liberal bookings on every hand, the eastern iron and steel industry is giving its principal attention to the delivering of material sold and the question of shipments remains uppermost at present in the minds of both maker and consumer. Moreover, the steel mills are still booking new business actively, and are making no progress against deferred deliveries. Plates and shapes are strong in the east at a minimum of 1.60c, Pittsburgh, and some makers are considering the advisability of making further advances. Premiums of $7 a ton over this basis were paid on a prompt lot of plates the past week. An eastern steel maker has bought 20,000 tons of plates for first half from a nearby mill. Pig iron is moving heavily on contracts, but new buying is slow. Some low grade southern iron has been sold in this district on the basis of $14, Birmingham, for No. 2. Northern makers are holding schedules firmly. The scrap market is dull and weak.

Pig Iron.—Requirements of consumers for the first half seem to be covered in the main and present buying is either for filling in needs or for special demand such as from the cast iron pipe makers. The furnaces have ample bookings and are not disposed to push sales. So it is indicated that in the present absence of active inquiry, sizable tonnages could probably not be obtained except at some concessions, unless far extended deliveries were offered, such as last half, which makers are not yet up to the point of doing. There seems to be a growing belief among buyers, and some makers as well, that present prices are not likely to be much higher, if at all, for third quarter. There have been some reports of price concessions on regular grades of northern iron in the market, but it has not been shown that any first hand metal has been cut. Some resale lots of eastern foundry iron, however, have been absorbed at concessions. Standard eastern No. 2X is well held at $18.50, Philadelphia. Some southern forge has been sold into this district at $13, Birmingham, equivalent to $17.20, delivered, or on the basis of $14, for No. 2. A Delaware river pipe maker took 7,500 tons of No. 3 and forge for second quarter, giving part of it to southern makers at the price stated and the rest to Virginia and northern furnaces. The Virginia iron brought about $17.50, delivered, and the northern iron, $17.50 to $17.75, delivered. Some tentative inquiry for other pipe makers is pending. Inquiries for 1,000 tons of charcoal iron as well as 1,000 tons of malleable for January are unsatisfied. The latter grade is held at a minimum of $19.50, Philadelphia. Basic iron is in little demand as consumers are well covered. Prices are indefinite in the absence of sales. Low phosphorus metal continues very strong, $24.50, Philadelphia, representing the firm market for standard material. A steel castings interest is inquiring for 1,000 tons for first half. Several eastern furnaces have resumed, including No. 1 Hokendauqua and Leesport and Princess, in Virginia.

We quote for prompt and first quarter shipment delivered to consumers' plants, in Philadelphia and vicinity as follows:

Eastern Pa. No. 1X foundry	$18.75 to 19.00
Eastern Pa. No. 2X foundry	18.50 to 18.75
Eastern Pa. No. 2 plain	18.25 to 18.50
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.00 to 18.50
Malleable	19.50 to 20.00
Low phosphorus, Philadelphia	24.00 to 24.50

Iron and Steel Bars.—Considerable new buying activity in steel bars is being done usually for third quarter or beyond at 1.40c, Pittsburgh base, or 1.55c, Philadelphia, and specifications are heavy. Most producers have no tonnage for first half, but one or two mills are able to offer a limited tonnage of bars and small angles before July 1. Prompt steel bars continue to bring 1.85c, tidewater, or higher. One eastern buyer took 2,000 tons for third quarter from a Pittsburgh district maker at 1.40c, and the Baltimore & Ohio railroad recently divided several thousand tons among different makers. An eastern steel company continues to inquire for 1,000 tons of rivet rods and 300 tons of flats for first quarter. Bar iron is strong and the 1.60c, eastern mill, price has practically disappeared. Sales are noted at 1.70c and 1.75c, eastern mill, and 1.80c, mill, is frequently asked. The plant of the Canton Iron & Steel Co., Baltimore, has resumed after several years of idleness. Shafting has been advanced two points to 58 and 53 off in base territory.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.70c to 1.80c. Prompt steel bars on mill shipments are quoted at 1.85c to 1.95c delivered and from store are quoted at 2c to 2.15c, delivered. Cut nails are quoted from $1.85 to $1.90, Philadelphia. Shafting is quoted at 58 and 53 off in base territory.

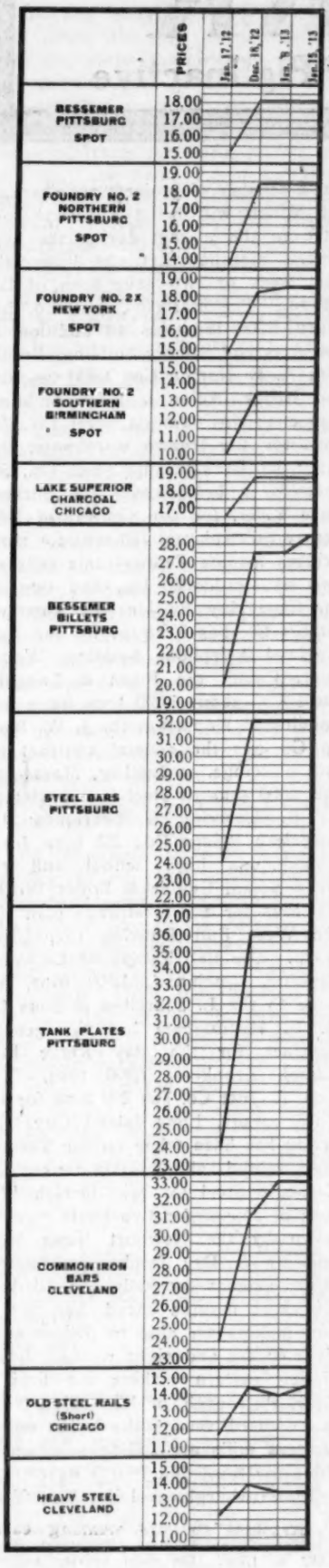
Plates.—Eastern plate mills report liberal new bookings at their full schedules of 1.60c and 1.65c, Pittsburgh, and that they are obtaining all the tonnage their capacities can conveniently handle. Contracts are usually avoided, but some for second quarter deliveries have been taken running six weeks or more, but where it is possible to make earlier shipments on some sizes, heavy premiums have been obtained. One sale for quick delivery was made at 2.10c, eastern mill. A lot of 2,000 tons for shipment as soon as the mill is able was taken at 1.65c, Pittsburgh. One Pittsburgh district mill has a moderate tonnage of plates before July 1, to offer at 1.50c, Pittsburgh. The Otis Steel Co. will furnish 5,000 to 6,000 tons for the fire boxes and boilers of the large locomotive order recently placed by the Harriman lines, leaving 2,000 to 3,000 tons of tank and universal steel to be closed. Four merchant vessels to require a round tonnage of plates are being figured upon by eastern yards. The Southern railroad is still inquiring for 2,500 tons of car material, largely plate for Lenoir City, Tenn., delivery.

An eastern Pennsylvania steel company which recently inquired for 20,000 tons of plates for first half delivery, has placed this contract with a nearby maker from whom it has drawn liberal tonnages in the past.

We quote delivered to consumers' plants in Philadelphia and vicinity: Sheared steel plates on contract 1.60c to 1.75c; universal steel plates on contract, 1.60c to 1.80c; sheared plates for early delivery, 1.75c to 1.85c; universal plates for early delivery 1.80c to 1.85c. Plates from store are quoted at 2.15c to 2.25c delivered.

Structural Shapes.—Among eastern mills, the minimum of the shape mar-

PRICE CHART



ket in sizable lots is 1.60c, Pittsburgh, or 1.75c, Philadelphia, but now and then some tonnage is taken by the larger makers at 1.45c, Pittsburgh. On miscellaneous lots from mill stocks, the market ranges from 1.75c upward. Deliveries run from ten to fifteen weeks, according to size. The American Bridge Co. has received 2,500 to 3,000 tons from the Penn Mutual Life Insurance Co. building, this city, but some litigation surrounding the proposed site renders this project uncertain at present. Barker & Ross have 750 tons for an office building for the department of commerce and labor, Washington, half of which is Bethlehem sections. The Jones & Laughlin Steel Co. has 600 tons for the City Trust building, Mobile, Ala. A. Y. M. C. A. building, Atlanta, Ga., 500 tons, and a surgical building for the University of Pennsylvania, this city, 500 tons, are to be revised. Bids have gone in for about 500 tons of column cores and other steel work for the Metropolitan building, this city. Bids are to be taken Jan. 30, at Washington, for about 22,000 tons of either plain or fabricated material for the Cristobal-Balboa transmission line, Panama canal.

We quote for delivery to consumers' plants in Philadelphia and vicinity: Structural shapes on contract 1.60c to 1.75c; for early delivery 1.80c to 2.00c; from warehouse stacks, 2.15c to 2.25c.

Sheets.—Several large inquiries for blue-annealed sheets are before eastern makers. There is active miscellaneous ordering and eastern makers find no difficulty in obtaining from 1.90c to 1.95c, Pittsburgh, for No. 10 gage, or 2.05c to 2.10c, Philadelphia. Deliveries run five to six weeks.

We quote for delivery to consumers' plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.95c to 2.10c.

Semi-Finished Steel.—An eastern maker will furnish about 10,000 tons of Bessemer billets for all of next year's delivery to a New Jersey buyer who has recently been active in the market. As recently reported, another eastern Pennsylvania maker will supply about 3,500 tons of open-hearth billets to the same consumer. A New England buyer is reported to have secured several thousand tons of open-hearth billets from a southern maker. Prices on semi-finished steel are very strong in the east and material is difficult to obtain. A Kentucky maker who has been offering some steel in the east has advanced its schedule $1 to a basis of $28, Pittsburgh, for open-hearth billets.

We quote delivered to consumers' plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $30 to $32 and forging billets at from $36 to $40.

Wrought Pipe.—The American Gas Co. has placed a contract with a Pittsburgh maker for its requirements of wrought steel pipe over all of the present year. About 2,000 tons will be required.

Mill Cinder and Scale.—Eastern sellers of mill cinder and mill scale report a liberal closing of contracts by eastern consumers for all of next year delivery at advanced prices. Present quotations being made are from $3.50 to $3.75 per ton, delivered, on mill cinder and from $5.50 to $5.75, delivered, on mill scale. These prices represent advances of 50 to 75 cents on cinder and $1 to $1.25 on scale. The tonnage handled this year is considerably larger than for several years past, owing to the more active operations of the iron mills now continuing or in prospect. Several furnaces are still negotiating for their requirements of this material as they have been holding out against paying the advances requested. Some furnacemen declare that owing to the advanced cost, they are unable to profitably use mill cinder or scale in their mixtures and that they are discontinuing its consumption.

Old Material.—The market does not gain any strength and remains easy and inactive. All the leading consumers are carrying heavy stocks and their yards are so filled that some of them are paying heavy demurrage charges to hold shipments at their plants, awaiting unloading. The odd lots of first grade steel moving in the open market are going at $14.50 to $15, delivered, and wrought scrap is also heavy. Domestic consumers of car wheels are now meeting the prices which foreign buyers have been offering, and the local market on this grade is higher. Several thousand tons of unsatisfied inquiry for Canada and Scotland is in the market. Several 1,000-ton lots of rerolling rails have been done at $16.50, delivered. Railroad offerings closing the past week brought better than $15 on heavy steel, over $16 on No. 1 wrought and over $16.25 on rerolling rails.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (rerolling)	16.50 to 17.00
No. 1 heavy melting steel	14.50 to 15.00
Old car wheels	16.00 to 16.50
Old iron axles	25.00 to 26.00
Old steel axles	20.50 to 21.50
No. 1 railroad wrought	16.00 to 16.50
Wrought pipe	13.00 to 14.00
Cast borings	11.00 to 11.50
Machine shop turnings	11.25 to 11.75
Heavy cast (broken)	15.00 to 15.50
Malleable	13.50 to 14.00
Stove plate	11.50 to 12.00
No. 1 forge	13.00 to 13.50
Low phosphorus	19.00 to 19.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

NEW YORK

Furnaces Not Aggressive---Buyers of Pig Inactive

Office of THE IRON TRADE REVIEW,
1115 West Street Bldg., Jan. 14.

Iron Ore. — Some buying of local ores continues at 7¾ to 8 cents per unit, delivered, in eastern Pennsylvania, but this is about the only evidence of activity in the ore market at present. Virtually nothing is being done on foreign ores at this time. Both foreign and domestic ores are being held at very firm prices.

Pig Iron.—New buying of pig iron remains at a low ebb in the metropolitan district, but producers are content with their well filled order books to await the regular appearance of consumers in the market and there is little appearance of aggression among the furnaces. Producers express an expectation of a new buying movement in a few weeks and until that period has elapsed, the market is not likely to see any special efforts put forth for additional bookings. Consumers, on the other hand, are comfortably covered and seem in no hurry to add to their purchases at present, as many of them feel that the forward market is not likely to advance materially in the near future. Some producers manifest a similar belief and a New York State buyer has just closed for 1,000 tons of No. 2 plain for full year delivery at the current level of prices. Quotations as they are being made on the light inquiry now current, show practically no deviation from the ruling values and iron in makers' hands is firmly held. Where concessions are appearing—and there have been a few cases here and there—these have been the result of re-sale iron seeking an outlet. A New England machinery builder continues to figure on 3,000 tons of No. 2X for forward shipment. In the export market, one inquiry for 3,000 tons of northern No. 2 for May, June and July, and another for 1,000 tons of Southern No. 2 for May and June for European buyers, are pending. Northern makers, however, have little opportunity to obtain such business at this time.

Northern foundry No. 1	$18.75 to 19.00
Northern No. 2X foundry	18.50 to 18.75
Northern No. 2 plain	18.25 to 18.50
No. 2 Virginia	18.80 to 19.00
No. 2 southern foundry	18.50 to 18.75
Malleable	19.50 to 20.00
Gray forge	17.50 to 17.75

Ferro-Alloys. — Re-sale ferro-manganese in second hands is conspicuous in the prompt and first half market at the present time and prices for these deliveries show a tendency to settle to the $65.00, seaboard basis, which is the firm level of makers for last half delivery. Some carload lots for prompt shipment have been done at $65.00, seaboard, which is considerably below former values and other material is available around this figure through middlemen. Makers of ferro-manganese have little tonnage to offer for first half and they are holding last half material firmly at the basis of $65.00, seaboard, which has ruled for some weeks. There is little inquiry at present for either ferro-manganese or ferro-alloys.

We quote standard English 80 per cent ferro-manganese at $65 to $68, seaboard, for early and for first half shipment and $65 for second half; 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia, for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—It is estimated by railway specialty manufacturers that there are 35,000 to 40,000 cars pending at the moment made up of smaller inquiries. The Canadian Pacific is inquiring for 3,500 and the Chesapeake & Ohio is expected to take action this month on 3,000 cars, some of which may be 70 tons capacity. The Pittsburgh & Lake Erie railroad has ordered 500 coke cars additional from the Pressed Steel Car Co. The Southern Railroad is about to close for 300 cars. The specialties for the large Harriman order have been awarded, but the distribution of the cars has not yet been made public. An independent plate mill will furnish about 6,000 tons for two boats recently taken by the Newport News Ship Building & Dry Dock Co. Plate prices among eastern makers continue to be firmly held at 1.60c to 1.65c mill, but middle western mills are taking some third and fourth quarter business at 1.45c to 1.50c, Pittsburgh. One large maker has some tonnage for first half at 1.50c, Pittsburgh. Specifications against plate contracts are very heavy.

We quote, delivered at New York tidewater, for first quarter, 1.76c to 1.86c New York, on sheared plates. Some makers are asking $1 higher for universal plates. On third quarter and last half contracts, Pittsburgh district, makers are quoting 1.61c to 1.66c, New York.

Structural Material.—Pending structural projects in the metropolitan district have been reduced by the recent awards to rather modest proportions, but a number of projects are developing which will bring a liberal tonnage to the market during the next several months. Leftings during the past week or two have been of fair extent. The Eastern Steel Co. has taken 2,700 tons for an addition to the Arts and Science building, Brooklyn; A. E. Norton Co., 1,300 tons for the Brody, Adler & Koch building, this city; the Cambria Steel Co., 700 tons for the Heinze warehouse, this city; the Pennsylvania Steel Co., 500 tons for a bridge over the Shrewsbury River, for the Central of New Jersey railroad, and 750 tons for three bridges for the Pennsylvania railroad, two at Braddock, Pa., and one on the Cape May division; the American Bridge Co. has 500 tons for the New England Telephone building, Waterbury, Conn.; the Jones & Laughlin Steel Co., about 1,000 tons for a mill building at Nomkeag; the J. W. Bishop Co. has the general contract for mill buildings, at Ludlow, Mass., and the 2,000 tons of steel is expected to go to Levering & Gerrigues; the American Bridge Co., 250 tons, for a Philadelphia high school and the Utica Steam Engine & Boiler Works, 300 tons for a cold storage plant for the West End Brewing Co., Utica, N. Y. The Bell Telephone Co. office building, Cincinnati, 1,500 tons, has gone to the L. Schreiber & Sons Co. R. E. Hemingham has the general contract for the Bay Ridge high school, Brooklyn, 1,900 tons. The Geo. A. Just Co. has 200 tons for the Ford garage, Long Island City. No action has been taken on the Toronto high school, about 2,000 tons. The Carnegie Steel Co. will furnish 1,600 tons of shapes for two boats recently taken by the Newport News Shipbuilding & Dry Dock Co. Eastern shape makers generally are filled up for three months ahead, but one or two makers are able to deliver some sizes in six and eight weeks. Prices among eastern makers are firm at 1.60c, Pittsburgh, or 1.76c, New York, and upward, though the larger middle western mills are selling some quantities for third and fourth quarters at 1.45c, Pittsburgh, or 1.61c, New York.

We quote for New York delivery for first quarter as follows: Structural shapes, 1.66c to 1.76c. On third quarter and last

half contracts, Pittsburgh district makers are quoting 1.61c to 1.66c New York.

Structural shapes from store, 2.15c.

Iron and Steel Bars. — Consumers find much difficulty to obtain steel bars for early shipment in tonnage lots and for small quantities for early delivery they are paying the premium mills from 1.85c, tidewater, upward. Some contracts for third quarter and last half are being taken by Pittsburgh mills at 1.40c, Pittsburgh. Iron bars are moving freely and eastern makers have no trouble to get from 1.60c to 1.70c at their mills.

We quote for New York delivery, steel bars on contract from 1.56c to 1.61c and common iron bars at 1.65c to 1.75c. Steel bars from store are quoted at 2.05c.

Cast Iron Pipe.—Some low prices have characterized recent public lettings in the east, the Boston award previously reported, having gone to the Standard Cast Iron Pipe & Foundry Co. at an average price of $22.35, delivered. This price was $3 a ton under the next bidder. Generally, makers are asking a higher scale of prices. January, so far in new buying, has been comparatively quiet and is much below in volume the month of December, when business was brisk. Bids have gone in on 1,100 tons for the borough of Queens, and are going in today on 500 tons for Lynn, Mass. Cambridge, Mass., takes bids tomorrow on 400 tons.

We quote six-inch pipe at from $24 to $26, f. o. b. New York, in carload lots.

Old Material.—Material has been moving heavily to buyers on old orders and principal eastern consuming points have been largely congested. Rejections have been very numerous and holders of material are more timid to sell under present conditions. The market is very quiet from a buying standpoint, however, as consumers are well filled. Prices are about even, but soft. There continues some export demand for car wheels. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$13.50 to 13.75
Old iron axles	22.00 to 22.50
Steel axles	17.00 to 17.50
Old steel shafting	16.50 to 17.00
No. 1 heavy melting steel	12.25 to 12.50
No. 1 R. R. wrought	14.25 to 14.50
Wrought pipe (not galvanized)	11.00 to 11.25
Cast borings	8.75 to 9.00
Machine shop turnings	8.75 to 9.00
Heavy cast	12.00 to 12.50
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixvile, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York

BUFFALO

Pig Iron Buying Very Light

Office of THE IRON TRADE REVIEW,
Buffalo, Jan. 14.

Pig Iron.—The placement for the week was the lightest reported in this district in some time. Buyers continue to hold off with the apparent intention of endeavoring to take advantage of any possible turn of the market which may result from the change in the administration and the action of congress on the tariff schedules. It is apparent to the furnacemen, however, that this situation is not a natural one, as they are being vigorously pressed for deliveries on iron under contract. Most of the users of foundry and malleable grades are under contract for first half requirements and the furnace interests are not seeking additional orders, despite the absence of buying on the part of the melters. Prices remain the same as quoted last week. Rogers, Brown & Co., put their No. 1 stack at the Susquehanna plant into commission this week, and are now operating all four of their furnaces there. No. 1 was drawn for relining and was to have gone in several weeks ago. The range for the week, f. o. b. Buffalo, is substantially as follows:

No. 1X foundry	$17.50 to 18.25
No. 2X foundry	17.25 to 18.00
No. 2 plain	17.00 to 17.75
No. 3 foundry	16.75 to 17.50
Gray forge	16.50 to 17.25
Malleable	17.25 to 18.00
Basic	18.00 to 18.25
*Charcoal	18.25 to 19.25
*Some grades	22.00

Finished Material. — The checking up of tonnages booked by the mills and agencies represented here, done since the first of the year, indicates more forcibly the certainty of a steel shortage before the close of 1913. Every day the sold up condition of the mills is becoming more and more apparent. Specifications continue to pour in with no let up in sight; deliveries remain extended to practically the limit and prices are holding rigidly to the figures quoted for some time on bars, shapes, plates, structural and practically all the lines. From every direction, there comes a constant demand for material. Customers covered up only to the end of first quarter are now making inquiries for their requirements over second and third quarter, but in seeking to place their orders they are asking the mills to book them and make deliveries when possible. In this respect the mills are not dealing with new customers. They are daily turning down such offers, reserving the little tonnage yet to be sold to meet at least a portion of the requirements of old established customers.

Sheets are in good demand, prices are absolutely firm and premiums of from $2 to $3 a ton being offered for deliveries within the next four weeks. Hoops have advanced to 1.60 to 1.70, Pittsburgh, as the absolute minimum. Cold rolled steel has been advanced to 58 per cent discount on carloads and 52 per cent on less than carload orders.

The Buffalo Structural Steel Co. has secured the contract for the steel in the new Foster-Milburn building, Buffalo, Colson & Hudson architects, requiring about 250 tons. The Corrugated Bar Co., Buffalo, has the contract for the reinforcing bars in the Yale Laundry Co. building, Syracuse, requiring a considerable tonnage.

Old Material.—A number of transactions limited in tonnage were concluded during the week with consumers both in and out of the district, causing an improvement in the tone of the market. The dealers look for a heavier volume of trading with the closing of the inventory period and are not inclined to alter prices. The schedule shows few changes since last week. Prices, f. o. b. Buffalo, on gross tons, are as follows:

Heavy melting steel	14.75 to 15.25
No. 1 railroad wrought scrap	15.25 to 15.75
No. 1 R. R. and mch. cast sc'p	14.00 to 14.50
Old steel axles	15.75 to 16.50
Iron axles	23.25 to 23.75
Car wheels	16.00 to 16.75
Railroad malleable scrap	13.25 to 13.50
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	16.75 to 17.25
Old iron rails	15.00 to 15.50
Tank iron	10.25 to 10.75
Boiler plate, sheared	14.50 to 15.00
Pipe and tank	10.00 to 10.50
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.25 to 11.75

Increasing Soaking Pits

In order to round out its intermediate capacity for handling hot steel, the Alan Wood Iron & Steel Co. is installing an additional soaking pit at the Ivy Rock, Pa., plant, making five pits in all with a capacity of about 1,000 tons daily. An additional gas producer is also being installed and the entire battery of producers is being so arranged that each single unit may be operated or cut off independently of the other, if desired.

CINCINNATI

Southern Iron is Weaker

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Jan. 14.

Pig Iron.—Most southern furnaces are weaker as to price. No. 2 foundry iron is now being offered by Tennessee stacks at $13.50, Birmingham, for first half delivery and at $14 by Alabama stacks, also for first half.

These are the same prices as prevailed for spot shipment during the latter part of last year.

The cause of the very apparent weakness in price is the quietness of the present market and the large production; also the presence of some re-sale iron offered at the above figures and sometimes lower has had its influence. The weakness is likely temporary, until a buying movement starts again.

Southern Ohio iron is also weaker and $16.75, Ironton, prevails for first half delivery.

With freight rates $3.25 from Birmingham and $1.20 from Ironton, prices at Cincinnati follow:

Southern foundry No. 1	$17.25 to 17.75
Southern foundry No. 2	16.75 to 17.25
Southern foundry No. 3	16.25 to 16.75
Southern foundry No. 4	16.00 to 16.50
Southern gray forge	15.75 to 16.25
Mottled	15.75 to 16.00
Southern No. 1 soft	17.25 to 17.75
Southern No. 2 soft	16.75 to 17.25
Standard southern car wheel	27.25 to 27.75
Northern No. 2	17.70 to 18.20
Northern No. 3	17.20 to 17.70
Northern No. 4	16.95 to 17.45
Silveries 8 per cent silicon	20.70 to 21.20

Finished Material.—Local mills and agencies are very cautious in most instances about making contracts for any delivery this year, as they have practically booked their output for the whole 12 months. One large local office states that it has been advised to book no orders for shipment before next September, but it is reported that several smaller makers of finished material in the east will sell for nearby shipment at prices a little above the general market. Specifications have been somewhat light during the past week in comparison with those during the latter part of last year, and dealers state that they are glad of this, as it will give them an opportunity to catch up on deliveries. Steel bars are quoted at from 1.40c to 1.45c, and structurals at from 1.45c to 1.50c, Pittsburgh basis. For other mill prices, see Pittsburgh report.

The local sheet mill has been forced to close down temporarily, owing to the present high stage of the Ohio river, which has flooded part of its plant. Prices with the mill are very strong and are as follows, Pittsburgh basis: Black sheets, No. 28 gage, 2.35c, and galvanized sheets, No. 28 gage, 3.50c.

The majority of the warehouses here are at present flooded on account of the high stage of the Ohio river, and business has been temporarily suspended. Some of the larger houses, however, are supplying the demand from branches in surrounding cities with immediate shipments. Prices are unchanged, and are as follows, f. o. b. Cincinnati:

Steel bars, 2c to 2.10c base; iron bars, 1.95c to 2.05c base; structurals, 2.10c to 2.20c base; plates, ¼ inch and over, 2.10c to 2.20c base; sheets, blue annealed, No. 10, 2.25c to 2.35c base; rivets, cone head, 2.60c to 2.70c base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c to 2.20c base; full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3½ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c to 2.25c; ⅞ inch square and larger, 2.25c to 2.35c; ½ inch square and larger, 2.35c to 2.45c; 5-16 to ⅜ inch square and larger, 2.55c to 2.65c; and ¼ inch square and larger, 2.65c to 2.75c.

Old Material.—The scrap iron market is at a standstill in regard to prices, but there is a general feeling that it is a little weaker than it was at this time last week. There is practically no new business of any note being transacted at the present time, one reason being that a number of the users of scrap in the city are at present idle, owing to the high water of the Ohio river having flooded their plants. There has, also, been more iron in the market for some time than the demand calls for, and this has caused a general unwillingness of the dealers to add more to their stocks already on hand. We quote below prices dealers will pay, and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$13.75 to 14.25
Old steel re-rolling	12.00 to 12.50
Old iron axles	18.25 to 18.75
Heavy melting scrap	12.00 to 12.50
Relaying rails	21.25 to 21.75
Bundled sheet scrap	9.00 to 9.50

Net Tons

Old No. 1 R. R. wrought	$11.25 to 11.75
No. 1 machine cast	11.50 to 12.00
No. 1 busheling	9.50 to 10.00
Stove plate	8.50 to 9.00
Machine shop turnings	7.50 to 8.00
Cast borings	7.75 to 8.25
Heavy turnings	8.00 to 8.50
Mixed cast	10.00 to 10.50
Malleable	7.75 to 8.25

BIRMINGHAM

Price Problems Still Unsettled

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Jan. 14.

Pig Iron.—This market failed to develop any feature of unusual interest in the past week, and the general conditions are about the same as last reported. So far, the sales that have resulted from the inquiry submitted since the first of the year, consist largely of carload quantities, with an occasional lot of 150 to 300 tons, all of which is for comparatively early delivery. The matter of price is still more or less uncertain. It is quite probable that any of the local producers would accept tonnage for delivery in the first half, and in certain specific cases, deliveries to cover the third quarter would no doubt be considered; but the trade is apparently unwilling to contract at the figures now being asked, and the producers have not shown a disposition to shade quotations. As to the shading reported in competitive territory by northern furnaces, it is hardly believed that local prices will be affected, at least for the present. The $14, Birmingham basis, is only applicable to certain brands, and for early shipment, while a significant portion of the tonnage sold in the past week brought a 50c per ton higher price. Several of the largest producers quote a basis of $14.50 at Birmingham, for any delivery in the first half, and those concerns which are not solicitous of additional tonnage for early shipment, have recently quoted a basis of $15 at Birming-

ham. Contrary to expectations, the aggregate accumulation of foundry iron was increased during the month of December some 10,000 tons. Warrant stock, and the stock of basic, was the same on Jan. 1 as on Dec. 1, making a total of 90,000 tons of all grades. The increase in the accumulation of foundry grades has just been offset by the changing of the Alice furnace from foundry to basic, and of course, all shipments are now being made at a heavier rate than in the later part of December, or through the first week in this month. The volume of inquiry being received for all grades gradually increases, and the territory from which the requests are made has widened considerably. The most important requirement now under consideration is that of 3,000 tons each of No. 3 foundry and gray forge, all of which is required in the first half. With this exception, the requirement before the selling interests are for less than 1,000 tons each, but the aggregate tonnage reasonably expected to be placed prior to Feb. 1 is around 30,000 tons.

The furnace companies are carrying over a larger tonnage due on old contracts than usual, and a peculiar feature of the market is the apparent indisposition of the purchasers to cancel such tonnage as has not been delivered. The rate at which consumers have been willing to accept shipments is also unusual, but this is largely accounted for by the difficulty under which deliveries have been effected in the past few months. In this, the scarcity of cars is still complained of, while labor conditions are probably more unsatisfactory. The matter of the supply of raw material to the furnace plants is not so serious as in the two weeks just past; but coke is very scarce, and is commanding unusually high prices, without a change in conditions in sight. With the market quiet, but firm, the schedule of prices below is quoted for the first half, per gross ton, f. o. b. cars, at Birmingham furnaces, viz.:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.50 to 14.00
No. 4 foundry	13.00 to 13.50
Gray forge	12.50 to 13.00
Mottled	12.00 to 12.50
Standard basic	14.00 to 14.50
Off basic	11.00 to 11.50
Charcoal	25.00 to 25.60

Cast Iron Pipe.—An aggregate of some 10,000 tons of water pipe has just been placed in this market, and while no specifications for large requirements are being advertised, the general prospects for the spring and summer months are very encouraging. Shipments against old contracts have been held up more or less by the unfavorable weather conditions in the northwest, but stocks are not apparent, and, in fact, it is understood that as a result of the business recently placed, some addition will be made to the producing capacity. The price consideration for the large municipal contracts just entered is not made public, but for the small lots entered, the following schedule has been maintained, per net ton, f. o. b. cars here, viz.: 4-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe.

Old Material.—The condition of this market is probably more satisfactory than at any time for months past, due to the small accumulations of stock, and to the ready demand for such grades as can be assembled. Light cast and stove plate are moving in but small quantities, but all wrought and steel grades, car wheels, re-laying rails and axles, are being sold readily, and at such figures as to represent a fair margin to dealers. The local consumption of the grades mentioned is practically normal, and but little of the tonnage assembled locally is of necessity being offered in other markets. The prices dealers are asking for their holdings are about as follows, per gross ton, f. o. b. cars here, depending upon the nature of the requirement, and the local conditions at time inquiry is received, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	15.50 to 16.00
Old iron rails	15.50 to 16.00
No. 1 R. R. wrought	13.00 to 13.50
No. 2 R. R. wrought	11.50 to 12.00
No. 1 country wrought	10.00 to 10.50
No. 2 country wrought	9.00 to 9.50
No. 1 machinery cast	11.50 to 12.00
No. 1 steel scrap	11.00 to 11.50
Tram car wheels	11.00 to 11.50
Standard car wheels	13.00 to 13.50
Light cast and stove plate	10.00 to 10.50

S. W. Straus & Co., New York, are offering an issue of $115,000 first mortgage 6 per cent bonds of the A. M. Castle Co., Chicago, iron and steel merchants.

ST. LOUIS

Very Moderate Sales of Pig Iron

Office of THE IRON TRADE REVIEW,
St. Louis, Jan. 14.

Pig Iron.—The total sales of pig iron in the St. Louis territory within the last week probably did not exceed 1,500 tons, nearly all in small lots, and there is practically no inquiry out. Southern No. 2 is usually quoted at $14 to $14.50, Birmingham, by the furnaces, but it would not be difficult to obtain iron at $13.50, Birmingham. Northern iron is unchanged at $18.00, Chicago, and $16.50, Ironton. Prices on southern iron delivered, to which the Birmingham freight of $3.75 has been added, follow:

Southern No. 1	$17.75 to 18.50
Southern No. 2	17.25 to 18.00
Southern No. 3	17.00 to 17.50
Southern No. 4	16.75 to 17.25

Coke.—Three sales of by-product coke, amounting to 9,000 tons for future delivery, were reported today. With this exception, the coke business has not been brisk. By-product coke is quoted at $6.85, East St. Louis. Other grades of coke are quoted at follows:

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery; prompt 48-hour Connellsville furnace, $4.00; contract, $3.25; best 72-hour Virginia foundry, for immediate shipment, $4.25, and for next year, $4.00; 48-hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Finished Material.—While there is nothing of special importance in finished products, orders thus far in January are keeping pace with December in all lines, and prices are well maintained. The lumber and coal interests are buying light rails, and track fastenings are in good demand.

Old Material.—The demand for scrap iron has undergone a decided improvement, owing to the mills coming into the market, and dealers are looking forward to a steady, and perhaps an advance in the market. The Vandalia list for 500 tons of scrap will be closed Tuesday. Our prices on scrap follow:

Gross Tons

Old car wheels	$15.00 to 15.50
Old iron rails	15.00 to 15.50
Rerol'g rails (5 ft. and over)	15.50 to 16.00
Old st'l rails (3 feet and under)	14.00 to 14.50
Light section relayers (45 lbs. and under) subject to inspec.	24.00 to 25.00
Relay'g rails, subject to inspec.	24.00 to 25.00
Frogs, switches and guards	13.50 to 14.00
Heavy melting steel	13.50 to 14.00
Shoveling steel	11.75 to 12.00

Net Tons

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.00 to 15.25
Knuckles, couplers, springs	12.50 to 12.50
Shafting	15.00 to 15.50
Steel car axles	17.50 to 18.00
Iron car axles	21.50 to 22.00
Locomotive tires	13.00 to 13.50
Pipe and flues	8.00 to 8.50
Tank iron and cut boilers	8.00 to 8.50
No. 1 cut busheling	11.00 to 11.50
No. 2 cut busheling	9.00 to 9.50
Cast and mixed borings	8.25 to 8.75
Machine shop turnings	9.50 to 10.00
R. R. malleable	12.00 to 12.50
Agricultural, malleable	10.50 to 11.00
Stove plates	9.00 to 9.25
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 13.00

SHOT AND IRON SAND

Needs Present Protection Said Mr. Bacon at Tariff Hearing.

Washington, Jan. 14. — Edwin K. Bacon, manager of the Globe Steel Co., Mansfield, O., in the tariff hearings before the ways and means committee of the house today, presented a petition that no change be made in the present duty, one cent per pound, on shot and iron sand. His company, said Mr. Bacon, is the only manufacturer in this country of this product, which is used in considerable quantities for polishing granite, for use in nection with sand-blast machinery, etc. All other concerns which have attempted to manufacture shot in the United States hitherto have been forced to abandon its manufacture as a result of the ruinous foreign competition.

The Harrison Supply Co., Boston, said Mr. Bacon, has a monopoly in the sale of foreign made shot. Importations for the year ending June 30, 1912, showed a gain of 331,775 pounds over the preceding year, with an increase of duty paid of $3,217.75, a gain of about 15⅓ per cent, thus showing that the present duty is no barrier to the importers.

Mr. Bacon urged the necessity of ample protection on the following grounds: The higher cost of labor, $2 a day here as against 80 to 85 cents abroad; the necessity of using special pig iron here, costing $18.85 per ton, while the foreign manufacturers use cheap grades of scrap; the inability of American manufacturers to furnish standard sizes on account of the excessive amount of off sizes and scrap made; the limited territory in which this material is used, and the ability of importers to purchase only the sizes used in the United States. Foreign manufacturers have an advantage over American manufacturers, said Mr. Bacon, since they can dispose of all the shot they make, as almost each different country uses a different size of shot; hence they are able to dispose of their entire output.

W. L. Kann, president of the Pittsburgh Crushed Steel Co., Pittsburgh, manufacturer of crushed steel material for use in sand blast equipment, also declared himself as being very much opposed to any reduction in the duty on such material, his statement being along the same lines as that submitted by Mr. Bacon.

Will Require Great Tonnage.—Bids for the first section of the new dual rapid transit system to be built in the borough of Queens, New York City, will be opened Jan. 28, by the public service commission. The section is that known as No. 2, and will be part of an elevated line to be built from the Queensboro bridge to Mitmars avenue, Astoria. This will be the initial contract to be awarded of the numerous extensions which will constitute the dual system and will require an enormous iron and steel tonnage.

LIKE A SHIP

New Warehouse For Castings Storage at Ampere, N. J., is Built.

A new kind of warehouse building used for storing iron and steel castings has just been completed at the works of the Crocker-Wheeler Co., of Ampere, N. J. It is known as a marine warehouse because its roof construction embraces the principle of the hatchways on a ship.

This new departure, the only one of its kind, consists of a building 85 feet long by 38 feet wide and 13 feet high to the rafters, which gives it a capacity of over 40,000 cubic feet. The peak of the slightly sloping roof is 15 feet high. In each side of the roof there are six big hatch covers 12 feet 10 inches by 10 feet 4 inches, resting on strongly built coamings, protected by metal sheathing. A 10-ton traveling crane, on tracks high enough to give sufficient clearance for the largest castings, is used to drop them into place through the hatchways. This method of handling the castings not only saves the cost of putting in an industrial railway, but also the space necessary to move around small hand cars inside of the building. The hatches are so large that the castings can be put down anywhere, and, thus all of the space can be utilized. The hatch covers themselves are also moved by the crane which is hooked on to steel rods across their tops secured to them on the side and cover.

The structure is of wood on concrete foundations. The floor consists of solid earth and clay soil smoothed off with cinders to absorb the moisture. The sides are of sheathing and clapboards, and the roof is covered with boards and slag roofing. It is supported by five uprights in the center of the building. The slope of the roof is easy and a handrail along the top protects the workingmen from falling. Access to it is gained by a stairway at one end. The building is well lighted with 12 windows on each side. The main entrance, 10 by 14 feet, is closed by two sliding doors, and there is also a small opening at the rear end. The building took about six weeks to complete, and cost less than 50 cents a square foot.

AWARD OF MEDALS

Will be Made by American Museum of Safety in New York.

The annual awarding of medals by the American Museum of Safety will take place on Thursday evening, Jan. 23, at the United Engineering Societies building in New York. The notable award this year will be that of the new Rathenau medal to Thomas A. Edison. This will be the first award of the Rathenau medal, which, last summer was placed at the disposal of the American Museum of Safety by the Allgemeine Electricitaets Gesellschaft (A. E. G.), of Berlin, to be awarded annually for the best device or process in the electrical industry for safeguarding industrial life and health. The competition is open to the world and it is the first instance in which bestowal of a high European honor has been given to an American institution.

The inventions for which Mr. Edison is being awarded the Rathenau medal are the result of his latest experiments with the storage battery. It will be in recognition of his application of his storage battery in new forms with special adjuncts in relation to safety in mines, tunnels, work under water, in factories where explosives are made, powder magazines and where explosive gases are generated or in use. General application of the storage battery in this field has reduced the hazard to workers fully 100 per cent.

The Scientific American medal for the most efficient safety device invented during the past three years and exhibited at the Museum will be awarded to the inventor and maker of the pulmotor, the Draeger Oxygen Apparatus Co.

The Louis Livingston Seaman medal, which is for progress and achievement in the promotion of hygiene and sanitation, and the mitigation of occupational disease will be presented this year to the National Cash Register Co.

The Travelers Insurance Co. medal for the American employer who, in the judgment of the American Museum of Safety, has done the most for the protection of the lives and limbs of workmen, will be awarded to the New York Edison Co., for making safer the electrical industry.

Three Wilson & Snyder horizontal pumps are being installed at the plant of the Youngstown Sheet & Tube Co., Youngstown, O. Each will have a pumping capacity of 20,000 gallons daily.

COMMISSIONER RESIGNS

Robert Wuest of N. M. T. A. Retires After Years of Service.

Robert Wuest, commissioner of the National Metal Trades Association for the past five years, has presented his resignation which has been accepted with regret by the executive committee. This fact has been communicated to the members of the organization by President Henry D. Sharpe in a letter to them. Mr. Wuest has been seriously ill for several months, and last Sunday in company with Mrs. Wuest left for Florida, where they will remain until the middle of March.

ROBERT WUEST

The resignation of Commissioner Wuest will become effective after the next annual convention of the National Metal Trades Association, which will be held early in April in New York City. During the absence of Mr. Wuest in the south, his office will be filled by John D. Hibbard, of Chicago, who has been selected by the executive committee as acting commissioner. He will be chosen commissioner after the next annual convention.

The retirement of Commissioner Wuest from active service as an officer of the association will be learned with deep regret by its many members, all of whom are his friends. He has done valiant work for the upbuilding of this great organization and to him and his efforts is due much of the present day efficiency of the association. He has always insisted upon a fair chance for the employes of its members, advocated welfare work, sanitary inspection, accident prevention and many like measures that make for the safety and comfort of workingmen as well as for exact justice to them. It had been his aim to have continued in the harness until an employers' pension system could have been installed in the shops of all members of the N. M. T. A., this having especial reference to pensions for aged and faithful workmen.

Commissioner Wuest has been connected with the organization for over 10 years. He first became secretary in 1902, having been for years previous a member of the Cincinnati firm of Silbert & Wuest, paper bag manufacturers. His connection as secretary continued through the administration of Commissioner DuBrul. When Commissioner Eagen's health became affected, Mr. Wuest was named acting commissioner. Finally when Mr. Eagen died, Mr. Wuest was elected commissioner in July, 1907. Throughout his official career, Commissioner Wuest has aimed at the eminently practical, being a practical man. He stands among the most progressive leaders of commissioners of national organizations of employers, for his endeavor has always been to bring about harmony between employers and employes through the medium of exact justice and fair play to both. He has endeared himself to all who know him by his never-failing good fellowship, uniform courtesy and kindness of heart.

It is the earnest hope of his countless friends that Commissioner Wuest will entirely regain his heretofore rugged health, for they believe that his wide experience and close study of labor questions from a practical standpoint have made him a valuable man to his country.

Foundrymen Elect Officers

Robert C. Bird, of the Broadway Iron Foundry, Cambridge, Mass., was elected president of the New England Foundrymen's Association at the annual meeting held at the Exchange Club, Boston, Wednesday evening, Jan. 8. The other officers chosen were: Vice president, Charles L. Nutter, Old Colony Foundry Co., Bridgewater, Mass.; treasurer, Geo. H. Gibby, Gibby Foundry Co., East Boston, Mass.; secretary, Fred H. Stockwell, Barbour, Stockwell Co., Cambridge, Mass.; executive committee: Charles A. Reed, Reed, Fears & Miller, Boston; J. C. Hosford, Magee Furnace Co., Boston; D. K. Bartlett, Builders' Iron Foundry, Providence, R. I.; A. L. Clark, American Brake Shoe & Foundry Co., Norwood, Mass.; A. F. Corbin, Union Mfg. Co., New Britain, Conn. Following the regular dinner, the association was entertained by a series of vaudeville and musical acts.

The Exothermic Steel Co., of Pittsburgh, has filed notice of an increase of capital stock from $5,000 to $50,000.

METAL MARKETS

Copper Declines—Tin Brings High Prices

Chicago

Jan. 14.

New Metals.—The market for new metals appears to be spotty in sympathy with the break in copper. This is reflected principally in the quotations on lead which have declined from 4.27½c to 4.20c. Dealers, however, report considerable activity.

We quote dealers' selling prices f. o. b. Chicago:

Lake copper, carload lots, 17½c; casting, 17⅛c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.20c; lead, desilverized, 4.20c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 50.17c. Cookson's antimony, 10½c; other grades, 9c.

Old Metals.—The market for old metals is unsettled in sympathy with the break in copper and buyers show a disposition to hold off. On account of this condition, it is difficult to quote the market accurately.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Copper wire, crucible sheets, 17c; copper bottoms, 14½c; heavy red brass, 13¼c; heavy yellow brass, 10¼c; No. 1 red brass borings, 12½c; No. 1 yellow brass borings, 9.25c; brass clippings, 10½c; lead pipe, 4½c; zinc scrap, 5½c; tea lead, 4c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 47c; tin foil, 40c; linotype dross, 3½c; stereotype plates, 4c; stereotype dross, 3.50c; prime slab zinc dross, $131 a ton.

New York

Jan. 14.

Copper.—The marked absence of buying power which was shown following the unfavorable report of the Producers' Association apparently caused a stampede to sell toward the end of the week, resulting in a decline of more than 1c per pound in prices. Although few sales were made on the way down, and it is questionable if any have been negotiated at the lowest level, there is no legitimate reason to suppose that if consumers would come in for large amounts of the metal they could get it at around 16.50c. delivered. At this time there are no indications pointing to extensive buying until the demoralization caused by the severe decline has worn off. Based on efforts to sell made today, electrolytic is quotable at from 16.37½c to 16.50c, lake at 16.50c to 17c, and casting at 16.12½c to 16.25c. Leading producers are holding at ½c above those figures.

Tin.—Although tin was weak in the London market yesterday and this morning, the domestic market developed considerable strength towards the close of business, and the metal sold at the highest price witnessed here for several months. Transactions amounting to 80 tons of spot and January were made on the metal exchange, the final sales being at 51c for spot. This figure represents a premium of about 1c per pound over the cost to import.

Lead.—Business in lead has been fair and the market retains the firmer tone noted last week. Prompt and future shipments up to April are quoted at 4.35c in New York.

Spelter.—Sales of spelter have been made for delivery in January and February at 7.30c, recently. There is not a conspicuous demand, however, consumers displaying caution based on pending tariff action.

Antimony.—Little demand has prevailed for antimony and the few orders placed were taken at concessions from importers' prices. Cookson's is 10.12½c, Hallett's is 9.50c, and other brands are from 9c to 9.25c.

BESSEMER BOUGHT

By Jones & Laughlin Steel Co.—Late Pittsburgh News.

Pittsburgh, Jan. 15. (By wire.)—The Jones & Laughlin Steel Co. has been buying fairly large quantities of Bessemer during the last two weeks at what is reported as regular market prices. One of the company's Eliza stacks went out and is now being relined and pig iron purchases were made on that account. No definite announcement about size of tonnage has been made.

An inquiry has been received by mills in this district for 1,200 tons of 6-inch rounds running from 15 to 56 feet in length. The material will be shipped east. The demand for structural material has been especially heavy.

The market for ferro-manganese in this district is the same as it is in the east. Resale lots, forward delivery, can be obtained at $65 and prompt material, small lots, has been selling at that figure. Low priced tonnage comes as the result of heavy shipments by middlemen on last half contracts. There is not much demand.

WAGE INCREASE

By Corporation Will Be About Million Dollars Per Month.

The following statement has been issued by Elbert H. Gary, chairman of the United States Steel Corporation:

"In accordance with the recent announcement made by the chairman respecting an adjustment in wages, many of the subsidiary companies of the United States Steel Corporation have made up their schedules, which together aggregate an increase in wages of about $1,000,000 per month, commencing about Feb. 1. These benefits largely apply to the workmen receiving the lowest daily wages. Some of the mining companies are not included, for the reason that wages have been heretofore adjusted by those companies and are now above the average."

Former President Corey Will Testify

New York, Jan. 15. (By wire.) — Hearings in the government suit for the dissolution of the United States Steel Corporation will be resumed in New York Tuesday, Jan. 21, with Wm. E. Corey, former president, as first witness. The hearings will be held in room "N," in the St. Paul building, Broadway and Ann street.

Will Build Large Coal Dock

New York, Jan. 15. (By wire.) — The Carnegie Steel Co. will expend $250,000 for the construction of a large coal dock at Duquesne, which will serve as a transfer plant to assemble coal from mines and divert it to corporation subsidiaries in Cleveland and other outlying districts.

Elected Bank Directors. — Several prominent iron and steel men of Cleveland were elected to boards of directors of Cleveland banks, Jan. 14. J. H. Sheadle, secretary of the Cleveland-Cliffs Iron Co., became a director of the National Commercial Bank; Harry L. Kaufman, of E. N. Breitung & Co., was chosen a director of the First National Bank, and F. E. Drury, of the Cleveland Foundry Co., was elected a director of the Union National.

Electric Furnace Methods of Steel Production--VII

Descriptions of Various Types of Electric Refining Media, Including the Anderson, Colby, Greene, Harden, Hering, Nathusius, Stobie, Etc.

By John B C Kershaw

The group of electric furnaces that will be described in this article are less developed industrially than the types considered previously in this series; nevertheless they reflect the tremendous development in this practice in the last decade.

The Anderson furnace was designed by T. Scott Anderson, of Sheffield, Eng., and four furnaces, each of 5 tons capacity, have been installed for the production of steel from pig iron. This type of furnace is shown in sectional elevation in Fig. 8. In general appearance and design it resembles closely the Heroult refining furnace. It is provided with two water-jacketed electrodes which can be adjusted vertically and these may be operated either in parallel or series, according to the nature of the work required from the furnace. The special feature of the Anderson furnace is, however, the provision of electro-magnets underneath the base, by means of which the arc formed between the two electrodes can be drawn downwards and controlled. It is further claimed by the inventor that "the concentration of the incandescent gases around the electrode is utilized to the best advantage," and that the arrangement of the furnaces "tends to efficiency in a very marked degree,"—but no very definite information is given as to the means whereby these results are obtained.

The Chaplet Furnace

A sectional elevation of the Chaplet electric furnace is shown in Fig. 5. The two electrodes are suspended in two different chambers or divisions of the interior of the furnace which are connected by a lateral canal. The electric current flows from the positive to the negative electrode, by means of the metal contained in this canal. The metal in the larger chamber is melted and purified by combined arc and resistance heating, and the furnace resembles the Girod and Keller types, both in principle and in method of operation. A Chaplet furnace is reported to be in use at the works of the Acieries d'Allevard, Isere, France, but no details concerning the size or efficiency of this furnace, are available.

The Colby furnace is of the induction type and was patented by E. A. Colby in the United States in 1905. Fig 1 is a view of a small Colby furnace of 130 kilowatts capacity, installed in 1907 for melting tool steel, at the plant of Henry Disston & Sons, Tacony, near Philadelphia. In design and construction, the furnace resembles the Kjellin and Frick types. The primary coil of this furnace consisted of 28 turns of copper tube, 3/8 inch inside and 5/8 inch outside diameter, through which water flowed for cooling purposes. The annular crucible, the molten metal in which formed the secondary circuit of the furnace transformer, was 24 inches in outside diameter, 15 inches inside diameter, and was 8 inches deep. The trough held 190 pounds of steel when fully charged, and ingots weighing 90 pounds were poured every hour. The fusion of the added metal required half an hour and the same period was required for the refining and killing processes. The ingots poured were dense and homogeneous. The single-phase primary current used 240 volts and the maximum current employed was 540 amperes with a frequency of 60. The power used per 100 pounds of metal poured varied from 27.5 to

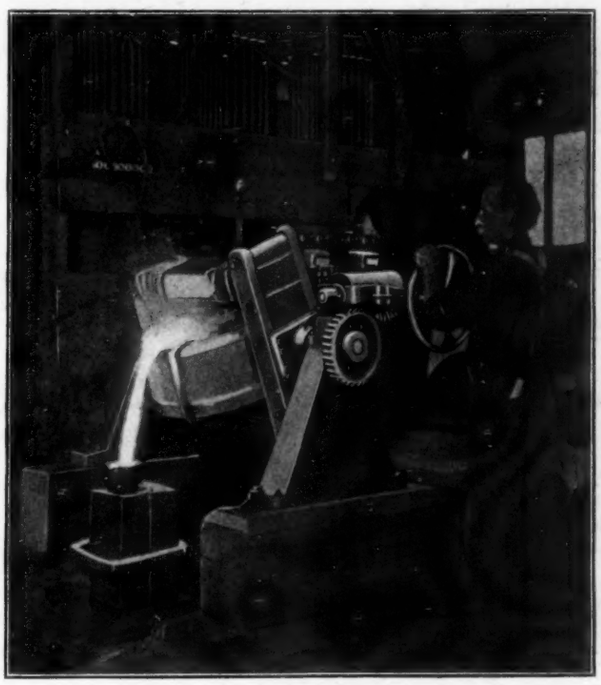


FIG. 1 — THE COLBY FURNACE, INSTALLED AT THE PLANT OF SAMUEL DISSTON & SONS

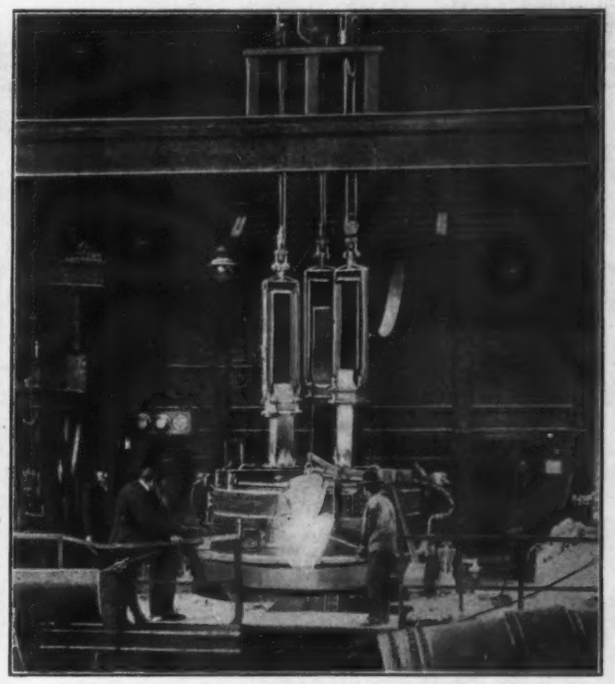


FIG. 2—A NATHUSIUS ELECTRIC FURNACE IN OPERATION

37.5 kilowatt-hours, according to the purity of the charged raw materials and the quality of steel desired; this is equivalent to from 605 to 825 kilowatt-hours per ton of 2,200 pounds. The Colby furnace patents have been purchased by the American Electric Furnace Co., New York City, which also controls the United States patents of the Kjellin and Rochling-Rodenhauser electric furnaces. The Colby furnace at the Disston plant is not being operated at present, nor have additional installations been made in the United States.

Greene Process

The Greene process involves the use of any of the ordinary induction types of furnace, for producing steel direct from pig iron. The refining operation is effected by the use of producer gas which is blown into the molten metal contained in the annular ring or crucible of the induction furnace. This method of steel refining is termed the electric converter process and it is claimed that the losses incurred when refining pig iron by the ordinary Bessemer or open hearth processes, are largely minimized.

The process involves the use of a bath of molten, low phosphorus pig iron containing the usual proportions of manganese, silicon and carbon. The charge must contain sufficient manganese and silicon, however, to more than meet the specifications for the particular steel required. The bath is raised to a temperature of more than 1,425 degrees Cent., and is maintained at this temperature by electric heating, while a gaseous mixture

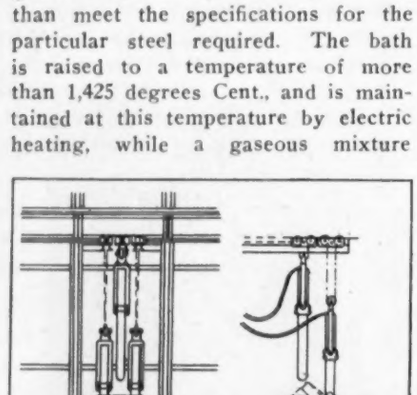


FIG. 3—FRONT AND SIDE ELEVATION OF THE NATHUSIUS FURNACE

containing CO and CO_2 is blown into the metal, in much the same way that air is blown into a Tropenas converter. The gaseous mixture may contain 12 to 18 per cent of CO, and 5 per cent or more of CO_2.

The rate of elimination of the carbon is a little slower than in the ordinary Bessemer process for the same rate of blowing. A well-operated side-blow converter requires from 25 to 35 minutes to make a blow, using about 1,500 cubic feet of air per minute, per ton of metal. In the small induction furnace, using about

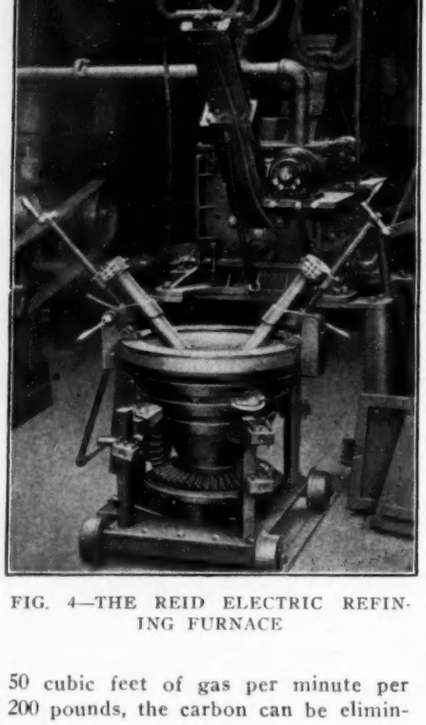


FIG. 4—THE REID ELECTRIC REFINING FURNACE

50 cubic feet of gas per minute per 200 pounds, the carbon can be eliminated in about 1½ hours, the exact time depending on how much carbon there was in the pig iron used. Thus, with only one-third as much gas blown per minute, per unit weight of metal, the time is a little more than three times as long as for a similarly blown vessel using air. By increasing the rate of blowing the time required for refining can be reduced considerably. The rate of elimination depends largely on the nature of the contact of the gas with the metal, and when the gas is blown through the metal, as in this process, the carbon elimination is hastened.

No Slag Formation

It was found that the gas could be blown into the metal, without the formation of slag and without boiling. The most convincing evidence, however, that oxidation does not take place in the process, may be found in connection with the loss of manganese. In converting a 13.4 per cent spiegeleisen into manganese steel, the inventor states he has dispensed with additions of any kind, and that he has produced a steel containing over 12.5 per cent manganese, without the use of a slag to prevent vaporization. The carbon was reduced from over 4 per cent to 1.20 per cent. In later tests, using a lime slag, the vaporization loss has been further diminished.

The process described for oxidizing carbon, without oxidizing iron, is similarly applicable to the removal of phosphorus. The inventor has found that he can eliminate the phosphorus from the iron and hold it out by means of lime, and that he can effect this purification with practically no oxidation of iron and manganese. This elimination of the phosphorus has been effected at temperatures below 1,350 degrees Cent., and without oxidizing carbon. It also has been effected at higher temperatures, above 1,500 degrees Cent. and up to 1,900 degrees Cent., after the carbon has been oxidized. In addition, it was found that the sulphur can be taken up and held in the same slag that holds the phosphorus, this action being attributed to the absence of oxide of iron in the slag.

A low grade pig iron has been converted into a high grade steel in one continuous operation in this way, taking out first the carbon without oxidation of the iron and manganese, and then, by continuing the blow of the gaseous mixture with a lime slag on top of the metal, the phosphorus has been oxidized and eliminated. The phosphorus was found combined with the lime, as calcium-phosphate, and practically all the sulphur was found in the slag as calcium-sulphide. With reference to the results obtained by this process, Greene has made the following comparison of the analyses

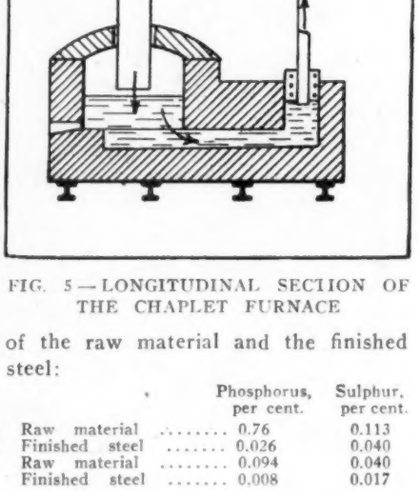


FIG. 5—LONGITUDINAL SECTION OF THE CHAPLET FURNACE

of the raw material and the finished steel:

	Phosphorus, per cent.	Sulphur, per cent.
Raw material	0.76	0.113
Finished steel	0.026	0.040
Raw material	0.094	0.040
Finished steel	0.008	0.017

Although Greene has stated that the

process has been carried out in the United States with the 2-ton induction furnace shown in Fig. 7, and that in larger furnaces of this type a power consumption of only 30 kilowatt hours per ton of steel would be required, the electric converter principle does not appear to have been developed industrially in the United States. As a possible scientific development of the application of the electric induction furnace to steel manufacture the Greene process is, however, of great interest and is worthy of close study. Greene has pointed out that the provision of a suitable gas for working the process in large works would not be a difficult problem, as the substitution of a gas containing carbon monoxide and carbon dioxide, for the air used in the ordinary Bessemer process, does not involve any change in present methods. A suitable gas for carrying out this process is available from cupolas or blast furnaces, or may be made in a gas producer. Blast furnace gas should be diluted by admixture with stack gas, since the percentage of carbon monoxide in blast furnace gas is usually much higher than is required. This is a gas producer process in so far as the elimination of carbon is concerned, as the resultant gas is richer in CO and lower in CO_2 than that blown into the metal. This makes it possible to use the gas repeatedly, by burning a part of it in order to maintain the desired composition.

The Harden furnace is of the combined arc and resistance type, and is designed to eliminate the defect of the original Kjellin furnace, in which the temperature was too low and the

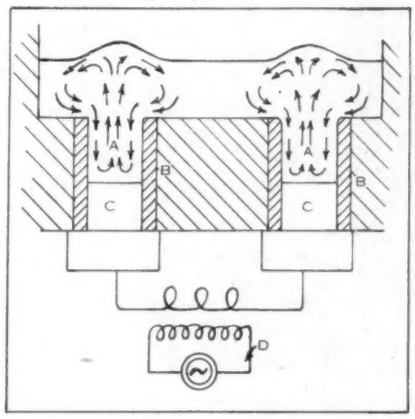


FIG. 6 — DIAGRAM SHOWING THE ELECTRIC PRINCIPLE OF THE HERING FURNACE

slag surface too small to permit of the proper elimination of the phosphorus and sulphur from the charged metal. The new furnace is shown in Figs. 10 and 11.

In the Harden furnace the bath is heated, both from the surface of the slag by means of suitably arranged arcs, and also from the sides and bottom of the bath, by side plates similar to those used in the Rochling-Rodenhauser furnace. In this manner the metallurgist is able to apply the maximum heat exactly where he wishes to have it, since both circuits can be regulated as desired. During desulphurization and dephosphorization, the slag is heated to a temperature higher than that of the steel, while during the period of degasifying, the bulk of the power is

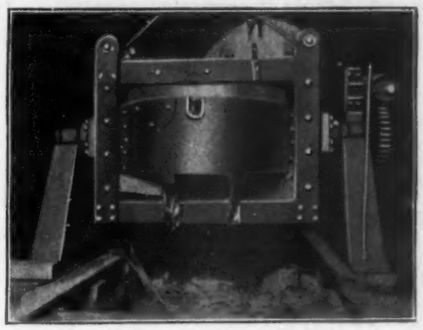


FIG. 7 — INDUCTION FURNACE FOR CARRYING OUT THE GREENE PROCESS

conveyed to the bath through the bottom and sides.

This design involves other important improvements. For example, the cold furnace can be started by means of the arcs, thus dispensing with the necessity of filling-in a liquid charge. Further, the electrode problem in ordinary arc furnaces may, in many cases, become serious, as large electrodes for furnaces of great capacities are high in first cost and expensive to maintain. Owing to the peculiar design of the Harden furnace, in which only a small portion of the power enters the furnace through the electrodes, this cost is considerably reduced. If, for instance, the upper limit of an arc furnace is 20 tons, on account of the difficulty in obtaining sufficiently large electrodes, it will be found that this capacity can be doubled with the Harden type.

The electrodes for a 30-ton, three-phase Harden furnace would have a cross-section of 255 square inches and in a 50-ton furnace, the electrodes would be 24 inches square, or 576 square inches. This would give a maximum of 24.5 to 26 amperes per square inch, which experience has proved, is well within reasonable limits, both from an electrical and manufacturing point of view. These sizes of carbons correspond to those employed in arc furnaces having capacities of only 12-14 tons, and 18-22 tons, respectively.

A further advantage claimed for this design, is the greater durability of the roof. The roof is the part of an ordinary arc furnace, which is most rapidly destroyed by the action of the hot gases. In the Harden furnace the destructive action is minimized, as only a small portion of the power is acting on the slag.

This furnace has been patented by J. Harden and the Grondal-Kjellin Co., Ltd., and an experimental unit has been installed in Germany, at the Rochling Iron & Steel works. No figures are available showing the operating results, but it is expected that furnaces of this type can be built and operated successfully in sizes up to 50 tons capacity.

The Hering Furnace

The *pinch effect*, upon which C. Hering's patent electric furnace is based, was discovered by the inventor when working with an electric furnace, in which this effect was disadvantageous and not desired. The phenomenon is electro-magnetic, and is due to the physical contraction of the cross-section of any liquid conductor through which a current is passing, this contraction or *pinch effect* being sufficient, under certain conditions, to rupture the conductor and break the current. Carl Hering, impressed with the practical possibilities of this phenomenon, has designed both an electric furnace, and a valveless electro-magnetic pump based upon the *pinch effect* principle. Fig. 6 shows a diagrammatic cross-section of the Hering furnace, and Fig. 9 illustrates a section and plan

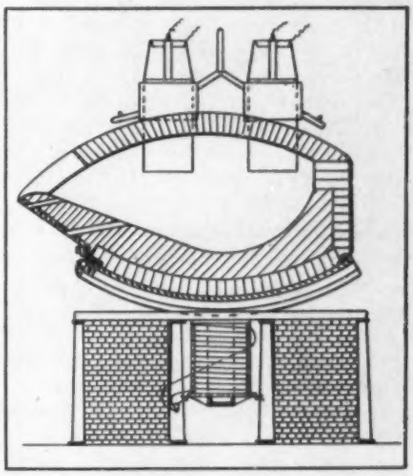


FIG. 8—SECTIONAL VIEW OF THE ANDERSON FURNACE

views of a tilting furnace based on this principle.

Fig. 6 illustrates the cross-section of two liquid conductors, *A*, surrounded by non-conducting material,

B. The current enters and leaves by the water-cooled electrodes, *C*, *D* being the transformer. Assuming that each liquid conductor is made up of a number of elemental conductors, it is evident that these will be attracted to each other, in accordance with the law that "like currents attract." The molten metal, therefore, is circulated,

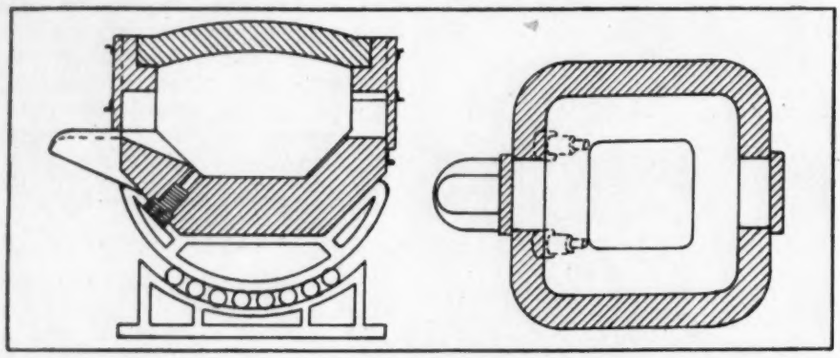


FIG. 9—SECTIONAL AND PLAN VIEWS OF THE HERING ELECTRIC FURNACE

as indicated by the arrows, the metal moving from the circumference to the center. As one end of the opening is closed by the electrode, any pressure set up only can be relieved by the liquid moving upwards as in a fountain, and this action results. The furnace may be of the tilting type, or a taphole may be provided above the top of the resistance tubes. In any case the resister tubes must not be emptied, and sufficient metal must be left in the bottom of the furnace to connect these tubes. Fig. 9 shows clearly how small the two electrodes are in comparison with the area of the furnace. The electrodes are inclined to reduce the surface pressure.

In some cases the agitation at the top of the metal bath, is so great that the surface is inclined at 45 degrees. The suction into the bottom of the resistance tubes also is considerable. It should be noted that the heating of the metal is effected entirely at the bottom of the charge and that the circulation from the bottom is toward the surface of the bath. Heat is transferred to the whole of the charge by vigorous stirring, and not by mere suction. The electrodes consist of the metal that is being melted. The sections of the electrodes, and the current that passes, are so proportioned, that the ends of the electrodes are raised to a temperature as nearly as possible equal to the temperature of the molten charge.

Of the various materials used for electrodes, Mr. Hering's experience has proved that metal electrodes are distinctly cheaper and more economical in energy. Copper is the best and iron is as good; gas-carbon is the worst, graphite being only slightly better than gas-carbon.

As the hottest metal flows through the center of the resister tubes, the lining is not subjected to the greatest heat. The eroding action, due to friction on the wall, is slight, because the *pinch effect* has a tendency to pull the metal away from the lining and form a vacuum. This is the opposite of that effect in other furnaces, where the circulation of the molten metal has given trouble by cutting out the lining. Magnesite powder is employed for lining the furnace. It is packed in position while in plastic condition, and after being heated forms an extremely hard and smooth, glossy furnace.

The circulation of the metal in the furnace permits chemical changes to take place rapidly, and the maximum temperature at any point, does not need to be much above the normal. In other furnaces, where the circulation is sluggish, the temperatures in the charge vary considerably. To obtain the maximum efficiency from the action of the slag it is important that the hottest metal should impinge directly upon it. This occurs in the Hering furnace, as the metal, when it leaves the center of the tube, is forced upwardly against the blanket of slag.

The furnace can be operated with either direct or alternating current. With alternating current, the power factor can be raised to practically unity; the frequency need not be low, and may be chosen to suit the ordinary generating machinery. If the electrodes are made of the same metal or material as the charge, the furnace tends to be self-regulating as to temperature. The advantages claimed for the Hering furnace, follow:

It consists merely of two holes, or three with 3-phase, in an ordinary furnace hearth, an electrode being provided at the bottom of each hole.

The heat is generated by resistance in the charge itself, and the heating takes place at the bottom of the bath, where it can be most effective.

The circulation of the hot charge is entirely automatic, and in a most effective direction, namely, from the bottom of the bath to the lower side of the blanket of slag.

The speed at which the mixing takes place is such that the charge is treated rapidly.

The electrodes are metal, being usually of the same material as the charge. They are not consumed, as is the case with carbon and graphite electrodes.

In furnaces using carbon or graphite electrodes, the temperature of the furnace is quite frequently higher than is really necessary. With the Hering furnace, on the other hand, the temperature and circulation of metal may be exactly adjusted to the metallurgical requirements.

Gaseous fuel heat can be applied to the top of the bath, without affecting any of the electrical gear. The current can be switched on all the time,

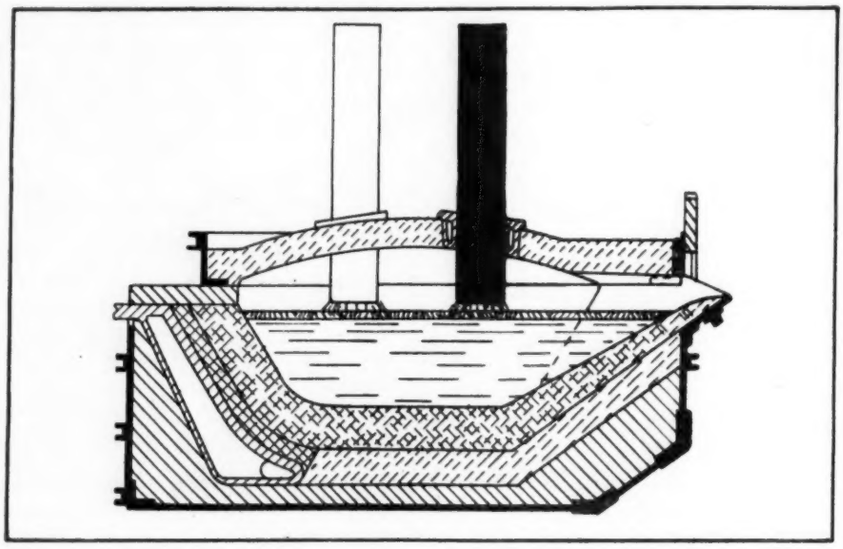


FIG. 10—SECTIONAL VIEW OF THE HARDEN FURNACE

or only for the refining part of the process.

All the electrical gear is out of the way on the underside, and if the furnace is required to tilt, a transformer can be attached to it, so that the flexible leads for the high-tension current can be of small section.

Mr. Hering claims that with slight modification, the *pinch effect* furnace might be applied to making steel direct from the ore. For this purpose a double furnace would be employed, and the carbon monoxide gas given off by one furnace would be employed to preheat the ore. In one section of the furnace carbon would be dissolved in the iron; in the other iron oxide, and by the reaction of the two, the carbon would be eliminated.

The Nau Furnace

The Nau furnace and process has been designed for the preliminary refining of phosphoretic pig iron, too high in silicon to be treated directly in the open-hearth furnace. The process involves running molten pig iron through a column of heated iron ore, and in allowing a bath of molten metal to accumulate at the bottom of the ore column. The intimate contact between the molten pig iron and the ore maintained at a high temperature, leads to a chemical reaction between the silicon and the iron oxide of the ore. The final temperature attained is found to remain sufficiently high to produce a fluid slag, and a molten pig that can be run easily from the melting furnace. The silicon and portions of the phosphorus and manganese, are eliminated by this process and are found in the slag. The inventor of the process also has designed a special form of electric furnace, which permits easy immersion of the ore in the metal that is to be refined. This furnace is provided with a water-cooled, cast iron roof and is surmounted by an ore shaft with a lateral inlet for the liquid pig iron that is to be refined. Vertical electrodes, penetrating the roof, are placed around the shaft. The bottom is made of carbon paste, and the electric current passing between the electrodes and the carbon bottom, traverses the liquid metal and slag, thereby keeping it heated to the desired temperature.

The furnace is so arranged and the operations are so conducted, that the refining ore required is kept immersed to any desired depth, in the metal to be treated. As soon as the ore in the bath is consumed and has to be replaced by new ore, the latter can be immersed in the liquid bath.

The inventor estimates, that per ton of metal treated, the removal of the silicon, phosphorus and manganese will require 44,724 calories, and that in order to supply this loss of heat, and to maintain the metal and slag at a temperature of from 1,200 to 1,400 degrees Cent., 2,100 electric horsepower hours would be required. Under more favorable conditions, the chemical reactions might, however, supply sufficient heat to keep the process working without any external heat supply, and thus at times the process could be carried out on a self-supporting basis.

The Nathusius furnace has been designed to combine the advantages of the Heroult and Girod types. It is of the combined arc and resistance type, front and side elevations being shown in Fig. 3. The furnace is provided with three vertical, carbon electrodes, arranged symmetrically above the shell and also with three extra steel electrodes, arranged below, or in the bottom of the crucible. The six electrodes are connected to the inner and outer terminals of a three-phase generator, the molten metal in the crucible itself forming the neutral point of the system. As both the upper and lower electrodes are of mutually alternating polarity, the metal in the bath is subject to a great variety of heating currents, and the thermal efficiency of the furnace is stated to be high. The advantages claimed for this furnace follow:

Excellent mixing of the metal and the production of a uniform melt, results due to the rotary fields set up by the vertical currents that traverse the molten bath.

Rapid heating due to the presence of three arcs, and of three fields of heat activity.

The convenience and economy of a three-phase current supply.

Easy regulation by means of a booster transformer, or special generator with an adjustable neutral conductor.

The heat effect can be concentrated where it is most desired, namely, in the slag during the earlier stage of the refining process, and in the molten bath, during the latter stages, when the slag has finished its work and the rest or quiesceent period of the refining process, has been entered upon.

The furnace, Fig. 2, is of the tilting type, the electrodes being suspended from cables operating over pulleys.

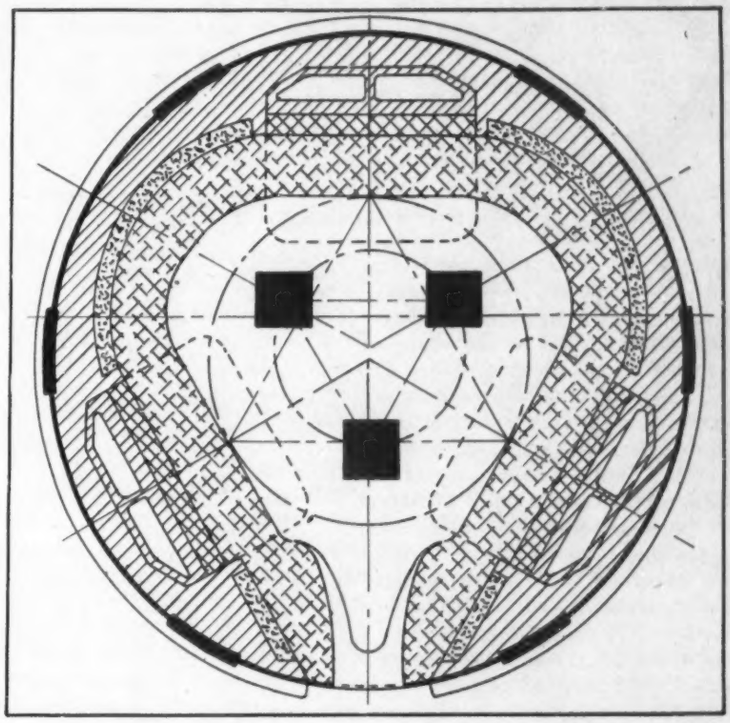


FIG. 11—PLAN VIEW OF THE HARDEN FURNACE

The Queseau furnace is similar to the Hering, both in principle and design, the pinch effect being made use of to produce a series of regular pulsations in a bath of molten metal, heated by resistance. One or more steel electrodes are fixed in the bottom of the furnace. The upper ends of these are molten, and are in direct contact with the molten furnace charge. These columns of molten steel, which form the electrodes, are enclosed in cavities lined with magnesite bricks set in tar, and the continual make and break of the electric current caused by the pinch effect,

creates a series of regular pulsations throughout the molten charge.

The Reid refining furnace, Fig. 4, is of the arc type, and is operated with carbon electrodes. This furnace was patented in the United States in February, 1910, by J. H. Reid. No efficiency or costs data relating to this furnace are available and it does not appear to have been applied to steel refining on a commercial scale of operation.

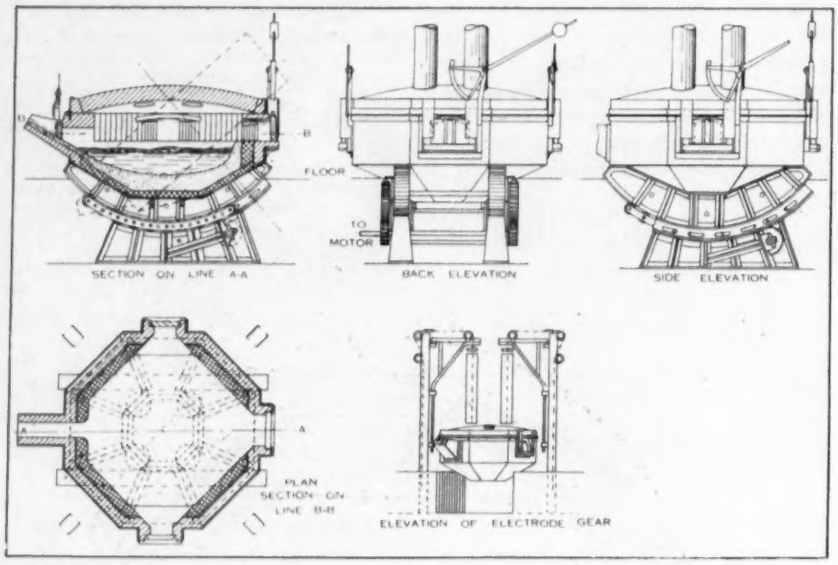


FIG. 12—VIEWS OF THE STOBIE, THREE-PHASE, 15-TON ELECTRIC REFINING FURNACE

The Soderburg furnace is of the arc and resistance type, and is similar to the Nathusius type in design and principle of operation. Richards, in the *Transactions* of the American Electrochemical Society (Volume XX. p. 413) has given details of a furnace of this type which is being erected at the works of the Jossingfford Mfg. Co., in Norway. This furnace is circular and will contain 2.5 tons of metal. The three electrodes passing through the roof, are connected to a three-phase generator by a star connection. Six ¾-inch electrodes, embedded in the hearth, serve as the connection to the bath which acts as the neutral point of the system. Thus, very little or no current passes through these embedded electrodes, while all the arcs from the upper electrodes pass in one direction only, namely, to the bath, and are not in series with each other.

Stobie Furnace

The Stobie heating and refining furnaces are the invention of Victor Stobie, of Sheffield, Eng., and are of the combined arc and resistance types. They differ, however, in some important details, from the Girod type of furnace construction. As a result of long experience in Sheffield tool steel manufacture, the designer has concluded that for small furnaces, arc heating alone is not economical and that some portion of the current should be employed concurrently for resistance heating by aid of a conducting lining to the furnace.

In the first experiments, a two-phase furnace was used which was provided with a single electrode embedded in the hearth, connected to the neutral point of the supply system, and with two electrodes above the bath, connected to the two phases of the supply. It was found, however, that by this arrangement, the passage of the whole of the return current which is equal to 70 per cent of the sum of the current, in the two phases, had too great a heating effect on the lining of the furnace, and it was impossible to obtain satisfactory results.

To overcome the difficulty caused by this overheating of the lining, the two phases were kept separate, and two electrodes were introduced into the hearth, each having an area three times as large as usual. The top electrodes immediately above these, were connected to the same phase of the supply system, the result being that each return current was obliged to travel by a separate conductor and to cross through the molten metal in the bath.

The advantages of this arrangement, according to Stobie, are:

The current density through the lining of the furnace is only a portion of what it was in the older type of two-phase furnaces and the bottom heating is sufficient for the purpose, without disintegrating the furnace lining.

The current travels through a longer path in the bath, thus aiding the resistance heating.

The crossing of the currents in the bath produces a mixing motion.

A plan and sectional elevation of the Stobie two-phase furnace is shown in Fig. 13.

Three-Phase Stobie Furnace

The three-phase furnace relies on arc-heating, as Stobie admits that in large furnaces there is no necessity to reinforce this by resistance heating. His three-phase current furnace is provided with four carbon electrodes; three of these are connected to the three terminals of a star-connected three-phase current supply and the

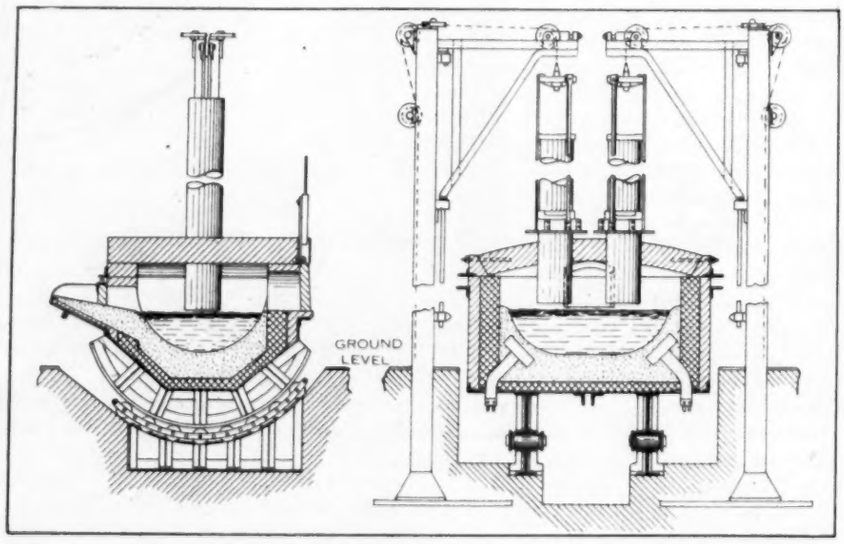


FIG. 13—STOBIE TWO-PHASE ELECTRIC REFINING FURNACE, HAVING A CAPACITY OF FIVE TONS

fourth is connected to the neutral point of the supply. According to the designer of the furnace, the latter is only required because a three-phase current when used for electric furnace work, can never be perfectly balanced, and a certain portion of the current is always traveling back by way of the neutral point of the system. This is an advantage rather than a disadvantage, since it increases the number of points within the furnace, at which heat is being developed. Fig. 12 shows a plan and sectional elevation of the three-phase furnace.

No figures are available showing the power consumption or operating costs of these furnaces, but they have been tried experimentally in Sheffield, and the Stobie Steel Co. has been formed to finance and equip a plant in Newcastle, with furnaces of this type. Two 15-ton furnaces on the three-phase system, and two or more 5-ton, two-phase furnaces are now in course of erection.

A supplementary patent issued to Stobie, relates to the use of oil or coal-gas for burning-in the hearth bottom of the furnace, and also for the preliminary heating and melting of the charge. The advantages claimed are:

The bottom lining of electric furnaces by this method can be made as solid as in the best open-hearth practice, whereas formerly the lining had to be rammed, and was never thoroughly burnt beyond an inch or two from the surface.

The preheating of the charge affords an advantage that has previously only been obtained by the use of molten steel melted in another furnace, such as an open-hearth or Bessemer installation, namely, a considerable reduction in the electric power required for the refining operations.

It is said that probably one of the most notable features of turbine progress is the remarkably short space of time in which its design has become feasible for both small and large powers. A few years ago the concentration of 50,000 horsepower in a single machine was scarcely dreamt of and while this has not yet been reached, units of 30,000-horsepower are being built today. In this connection it should be remembered a 30,000-horsepower unit will displace four of the largest reciprocating engines built, and further, it occupies but 25 per cent of the space and volume.

The annual meeting of the Institute of Metals will be held at London, March 11 and 12. Heretofore the annual gathering has been held in January.

Analyses of Government Coal

The United States bureau of mines maintains a fuel-inspection laboratory at Washington for analyzing samples of coal used by the different departments of the government. During the fiscal year 1912, there were received at the laboratory 11,246 samples of coal, taken for analysis from a total of approximately 1,500,000 tons bought under a specification providing for payment on the basis of heating value.

In taking these samples it has been found necessary, not alone to exercise care, but also to follow a set plan or routine. Samples are taken, which, as nearly as possible, fairly represent an average of the coal delivered. These samples are gathered together, crushed, mixed and parted, and this process is repeated until the sample is reduced to about three pounds in weight. This method of obtaining the sample makes the results of the analysis trustworthy, and the data reliable.

Economies Effected

Practically every department of government has availed itself of this service to a greater or lesser extent. Many striking cases of very large reductions in fuel costs at different plants have been reported. One government boiler plant alone has saved between $4,000 and $5,000 per year as a result of these investigations, and consequent suggestion from the bureau's engineers.

In general, the samples submitted have been analyzed for moisture, ash, volatile matter, sulphur and heating value. The upper or lower limit for these is usually specified in the contract, and payment is made to the contractor, at a price either higher or lower than that specified in the contract, according as the fuel is of more or less value than that called for in the standard specification embodied in the contract. By this method, the contractor is not unjustly penalized, and in the same way, the government pays for nothing that it does not get.

As a result of this work, savings of more than $15,000 per year have been made on both the Panama canal and the Panama railroad. When it is considered that the entire work was done by an average force of 13 men, of which number more than half were junior chemists, the low cost of the laboratory work in contrast to the tremendous saving, gives weight to the belief that the same principles of fuel buying might well be given a broader application to industrial plants.

The value of a laboratory analysis, of course, depends almost entirely upon obtaining samples which are truly representative of the coal delivered. Otherwise the results obtained are not alone worthless, but worse than worthless in that they are actually misleading and premise erroneous conclusions. It has been demonstrated, however, that dependable, representative samples may be obtained.

Moisture in Coal

In this connection, it has been learned that the moisture content is often effected in the sample, by the repeated crushings and grindings to which it is subjected in its preparation. The result of this has been very much in favor of the contractor in the matter of payments, and the government has found it necessary to contrive some protection against it. To that end, coal having the lowest moisture content is given the highest rating in awarding contracts, and a maximum moisture content which the delivered coal must not exceed, is fixed in the contract. If upon delivery of the coal, the moisture exceeds this fixed limit, a special sample is taken, and the contract price is reduced in accordance with the data thus obtained.

Much assistance in a purely advisory way, is being given by the bureau to different departments, in pointing out how boilers and furnaces may be better adapted to economically burning the fuel now being used, or how by changes in the equipment local coals, which are cheaper, but which have been rejected heretofore, may be advantageously utilized. A steaming contest was conducted to furnish the navy with data as to the value of western coals for vessels. Other similar tests have been conducted in behalf of government power plants in the District of Columbia.

This, and much other valuable information for those interested in the economical utilization of industrial fuels, will be found in the second annual report of the director of the bureau of mines.

"He Made Good" is the title of a 16-page booklet issued by McLain's System, Milwaukee, which contains the story of the rapid rise of Calvin P. Wolfe in the foundry trade. Mr. Wolfe is a graduate of the McLain school and in testimonial letters he points out his rapid advancement after having taken this course.

The Efficient Production of Cylindrical Work[1]

A Discussion of the Economies That Can Be Effected By Rough-Turning Cylindrical Work on a Lathe, With Subsequent Finish-Grinding

By C H Norton[2]

Turning is one of the oldest of the mechanic arts, and the lathe is one of the oldest metal working machines; but the lathe has been a very inefficient tool until the present time. We now have lathes so designed that they can be made efficient. I believe, however, that we are not, as a rule, using the modern high power lathes as we should, and are losing what they were designed to save, namely, time; that while we use them as roughing machines we also use them as refining machines.

Most cylindrical work must finally have size within small limits and must be truly cylindrical within still smaller limits, which led mechanics in the past to study the art of refined turning. When this art had reached a high degree of refinement, men discovered that it did not satisfy them and cylindrical grinding was introduced to give more refinement than could be obtained with the lathe. The natural conclusion at that time was that the grinding machine should take up the work of refinement after the limit of refinement had been reached with the lathe and the early grinding machines were, therefore, designed with this thought in view.

Use of the Grinding Machine

Later, however, it was shown that ground cylindrical work could be produced at a cost no greater than the turning alone had cost, simply by using the lathe to remove a large proportion of the metal necessary to be removed and not at all as a means of refinement; transferring the entire responsibility for refinement to the grinding machine.

While some understand this and are producing cylindrical work efficiently, I believe the great majority are still under the spell of tradition, and are turning what they call *good work*, work that shows care and skill on the part of the operator and accuracy in the lathe. Such care and skill with turned work is even more senseless today than the old time practice of shaping acorns on all screw heads and putting cast iron eagles on the tops of machine tools, because in the case of the former the grinding machine removes all trace of the lathe's accuracy and the operator's skill in a moment of time, while the latter remained for years to gratify the taste of those who had an eye for such artistic embellishment.

The developments of the last few years have developed the facts that, except in rare cases, efficiency in the production of cylindrical work means, (*a*) the use of the lathe as a roughing tool only, and (*b*) the modern grinding machine for refinement.

Roughed Work

Most lathe operators and most foremen seem to understand roughing to be simply the turning of work a few thousandths over the finish size, when in reality they are not roughing at all, but simply turning to a certain degree of refinement with the notion that by so doing they are doing a creditable job, and that they are helping the grinding machine. It is difficult to secure roughed work from lathe operators, that is, work that is not in any sense refined.

Tradition impels nearly all to consume much more time than would be necessary if the work were merely roughed, roughing being confused with a certain degree of refinement. Roughing is not refinement of any degree, and refinement does not necessarily mean perfection. There are many degrees of refinement, but never degrees of accuracy or perfection. Accuracy and perfection are final and fixed, they have no limits.

Those who would produce cylindrical work efficiently must recognize the fact that different cases require different degrees of refinement, and whether the work requires a very low degree of refinement or a degree closely approaching accuracy, the lathe work, to be efficient, should be the same as *rough* and as *cheap* as it is possible to make it.

The lathe today should be a roughing tool only, and the grinding machine a refining tool only, not a perfecting tool. Some grinding machines may produce greater refinement than others, but none can produce literally exact and perfect cylinders. While it is true many mechanics look upon a high degree of refinement as accuracy and speak of it as such, it is easy to prove that it is not accuracy, but simply a high degree of refinement. When all recognize these facts there will be greater efficiency in the production of cylindrical work.

Because these facts about roughing and refining are not well understood and men do not combine the lathe and grinding machine in a well-defined and efficient manner, the machine industry and railroads are losing large sums each year and I will try to show where some of the loss occurs.

We are losing because we turn closer than *about* 1/32 inch above the finish size. I use the word *about* because we lose by turning carefully. To require lathe work turned to thousandths today is like burning money for the fun of it. We are losing by allowing workmen to use any but the coarsest feeds possible in each case, even to the use of the screw cutting gears to obtain them.

Feeds as coarse as four to the inch should be used in some cases and six, eight and ten should be quite common. When work is too frail to allow such feeds with one cut, then another, or even three cuts should be made at faster cutting speed; for, while it is true that very coarse and imperfect turning will require longer to grind than close, careful turning, the combination of coarse, cheap turning with grinding will produce cylindrical work more efficiently. The modern grinding machine will remove metal most efficiently when that metal is in the form of coarse screw threads.

Coarse Turning

High ridges do not increase the cost of production. We lose money when workmen are allowed to caliper cylindrical work on the tops of the ridges, as nearly all do. This accounts for the misunderstanding about coarse turning and the allowance for grinding. Calipering on the tops of the ridges make it necessary to turn with relatively fine feed to enable clean grinding. To avoid this, some workmen use a broad nose tool with the

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[1]Presented at the New York meeting of the American Society of Mechanical Engineers.

[2]Norton Grinding Co., Worcester, Mass.

coarse feed which necessitates slower cutting speed because more metal is removed than with a pointed or grooved cutting tool. Ridges left by a more pointed tool do not increase the cost of producing that work, but decrease it.

It is so simple to feed by hand a slight distance at the end of the work, where the calipering can be done correctly, however coarse may be the power feed later, and however high the ridges. Money is lost by allowing workmen to measure roughed work elsewhere than at the end; hours are wasted by operators calipering at several points and then because of spring or tool wear, resetting and turning that portion again to secure straight work. They forget that the modern grinding machine was designed to do all of the straightening and all of the sizing, regardless of what the errors of roughing may be. They forget, or have never known, that the art of producing cylindrical work has progressed beyond that stage where it was necessary for the lathe to do its best before the grinding machine assumed the work of refinement.

The Modern Grinding Machine

The modern grinding machine is literally a correcting machine. The roughing can literally be rough, and roughness does not mean an approximate refinement. It is easy to figure the saving in time of turning a piece of work 6 inches in diameter by 6 feet long when the last cut before grinding is made with a feed of six per inch, instead of 32 per inch, which is very common. When it is considered that the grinding machine will grind this six per inch work to the finish size complete in less time than is required to file 32 per inch work, we see the great possibilities for saving cost with the lathe, if combined with a modern grinding machine.

In some cases money is lost by roughing at all in the lathe. Please note that I say *in some cases.* Efficient production of cylindrical work is usually accomplished by roughing first in the lathe, but there are cases when the difference in favor of grinding without first roughing in the lathe is very great.

The most important study for those who would secure efficient production of cylindrical work is the roughing of that work. It is here that the greatest possibilities for saving lie. If all would make a careful study of the roughing preparatory to grinding instead of trying to improve upon the methods of grinding advocated by grinding machine makers, there would result a more efficient production of cylindrical work and a clearer view of the real reasons why the grinding machine maker advocates certain methods, and why the modern heavy grinding machine was introduced.

Time Reduced by Grinding

At the works where large numbers of cylindrical pieces are manufactured, 1⅛ inches in diameter and about 10 to 11 inches long, 5 minutes was required to turn each, removing about 1/16 inch from the diameter, using a high-speed steel tool and revolving as rapidly as the tool would stand. The plan was to turn close to the finish diameter and care was taken to secure straight, smooth and round work to save time when grinding, because they considered the grinding expensive, and that this expense must of course be added to the cost of turning. The grinding in this case was 1 minute. The total time for producing these pieces was 6 minutes.

A change was made in the shape of the tool point and the size limit for turning increased. The traverse feed was increased, the cutting speed remained unchanged and the work was turned in 1 minute each, while the grinding time was doubled; the saving was 3 minutes, or one-half of the original time.

Some idea of what is lost by allowing lathe work to be turned straight, smooth and close to size before grinding may be obtained from the following illustration of actual work on some forgings, about 4 feet 6 inches long, turned portion to finish 2 inches plus or minus 0.0005 inch in diameter, and 3 feet long. The lathe operator turned these in the same manner that the majority of operators are now turning such work, namely, as such work was turned before grinding machines were introduced, except that 0.010 inch was left on the diameter for grinding. The turning required two cuts, as there was more than ⅛ inch to remove and the work was somewhat frail as well as irregular. The first cut was considered by the workman a very coarse, heavy cut; the second was like the last cut in the majority of shops. When ready for grinding, the time consumed by turning was a total of 25½ minutes. This appears to be too slow, but the forging was too slim to allow little, if any more, with one rough cut, and the lathe was an old-time, weak power, frail machine. The grinding time on this was 3 minutes, making a total of 28½ minutes.

When tradition was ignored and the work was made ready for grinding in the proper way, the following saving was accomplished: Two roughing cuts were taken, because the lathe was not powerful and the work was frail. The feed was ten per inch, cutting deep grooves; the time complete ready for grinding was 9 minutes. The work was not straight, and was what lathe men would style *a very poor job.* The grinding time to the exact limit was 9 minutes, or three times longer than with the more careful turning; a total of 18 minutes, a saving of 10½ minutes on each forging.

An attempt to rough this work with one cut instead of two resulted in a loss of 2 minutes. A modern lathe having more power with the direct belt would have carried the same feed and depth of cut a higher cutting speed with a still further reduction of time. This shows what may be accomplished with weak, low power lathes.

To install high power lathes and continue to turn just as smoothly and accurately as of old, simply allowing a few thousandths for grinding, would seem the height of wastefulness. Whether high power lathes or old low power lathes are used, mechanical industries are losing an enormous sum each year because of the lack of understanding of the real problem affecting the efficient production of cylindrical work, which is the proper combination in each individual case of rough-turning and grinding.

Saving in Finishing Shafts

Some idea of what we are losing by not wearing our *thinking caps,* is shown by the following: Plain shafts, 1 5/16 inches in diameter and 62 inches long, were to be made to ordinary limits of size and finish. Tests were made to determine whether it was better first to turn these or to grind direct from the rough bars. The turning required 6 minutes ready for finish grinding, while to grind off the same amount as was turned off required 9 minutes. A number of mechanics pronounced it cheaper to turn the shafts first, but in this case, after turning in 6 minutes, each shaft required straightening before grinding, which consumed 10 minutes, totaling 16 minutes. When the roughing was done by grinding instead of turning no straightening was necessary, and the roughing cut was removed in 9 minutes.

In this case, therefore, the turning was actually lost. There may be similar cases where the shafts will require some little straightening even if roughed by grinding, so that each case should be investigated instead of making a rule that all must or must

not be turned first. Usually, however, no straightening is necessary when the roughing is done by grinding.

Money is being lost because the majority of designers have not kept pace with the development along these lines. A well-known runabout motor car has a crankshaft, which if made about 1 inch longer overall could be produced for 50 cents less on each crank. When it is considered that about 30,000 of these cranks have been made, representing a possible saving of $15,000, we see the importance of considering the combination of lathe and grinding work.

The Question of Shoulders

Another feature affecting the cost of production is that of ordinary shoulders. This is overlooked by many designers and practically all draftsmen. It is easy to draw two sharp lines that cross each other and form a sharp corner and the fact that it costs less to provide room for the shoulder fillet on the other member than to make a sharp corner in the cylindrical member is lost sight of. This no doubt is the result of the experience of the past when there were no powerful grinding machines to locate and form such shoulders cheaper than the lathe. Shoulders to be made with the grinding wheel require a slight fillet.

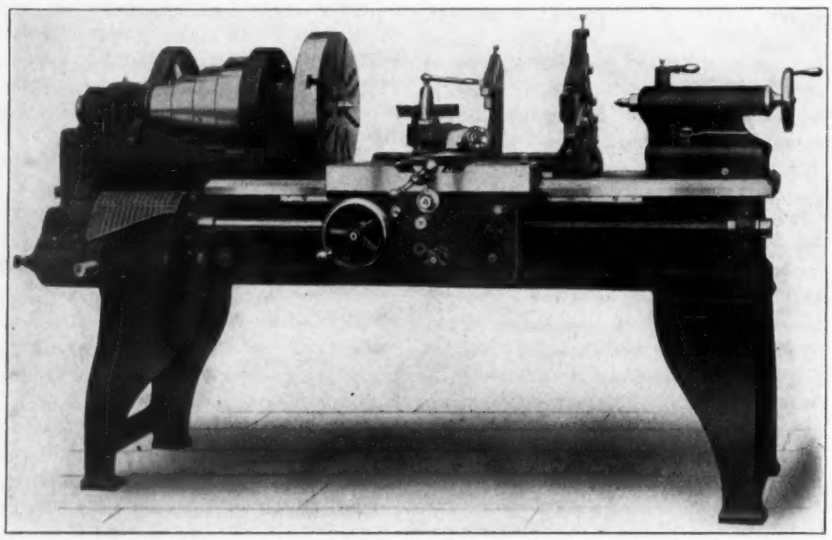
When numbers of duplicate pieces are to be produced and a small fillet is allowed, not only can the cylindrical portion be roughed with the lathe and not at all refined, but the shoulders can also be roughed, because the grinding machine, when required, is provided with a locating bar. By the use of this bar, the exact location of all shoulders can be secured by grinding and without measuring. At the same time the cylindrical portion can be ground with the same grinding wheel. The roughing in the lathe can be done with the same tool that roughs the cylindrical portion because the lathe, in this case, is not required to give to the shoulder any particular shape. When it is found best to *locate* and *finish* shoulders with the lathe because there is no locating bar for the grinding machine, it should not be necessary to neck-in at the shoulders for grinding. This is an old and out-of-date notion, for, with a shoulder cut sharp by the lathe tool, the grinding does not materially change the corner.

A more efficient method when no locating bar is at hand is to rough the work in the lathe, leaving the shoulders about 1/32 inch long and whatever angle the rough-turning tool may form. Next grind the cylindrical portion and at the same time cut out the angle at the shoulder with the grinding wheel. The work should then go to a lathe where a more skillful operator can locate the shoulders exactly; if a sharp corner is really necessary it can then be made.

Cylindrical Work Department

To produce cylindrical work efficiently we must make a study of all that affects the problem in each individual case instead of following tradition, which is costing us thousands of dollars each year. Lathe builders are offering some very efficient roughing lathes, but are we roughing with them? I think not in most cases. The real roughing lathe needs a good system of multiple steady rests to enable rapid and deep, coarse cuts to be made.

Instead of our lathe departments and grinding departments being separate, as is common now, there should be one department of cylindrical work under one head. This would check the tendency of the lathe department to treat its work as a finished product, and the tendency of the grinding department to insist upon close, careful turning in order to make a better showing of the grinding time, regardless of the real cost of production.



NEW 16-INCH ENGINE LATHE BUILT BY THE CINCINNATI IRON & STEEL CO.

A New 16-Inch Engine Lathe

A 16-inch engine lathe is now being built by the Cincinnati Iron & Steel Co., Cincinnati, which is so designed that only two levers are required to effect all of the changes in feed, which are made without changing gears. A safety device located between the feeds and lead screw make it possible to engage only one of the gears at a time. The apron is of the double-plate type with a back support and the feeds are obtained by a multiple-pitch steel worm and bronze worm wheel operating in oil. Both longitudinal and cross feeds are independent, but are obtained through the same friction and can be reversed in the apron. When the screw is disengaged, the half nuts are automatically locked, thereby eliminating the possibility of accidentally engaging the screw. Both cross feed and top slide screw are provided with micrometer graduations. The swivel slide is graduated on either side. As shown in the accompanying illustration, the bed is heavy and well ribbed throughout. The head stock is provided with long housings and the carriage has long bearings on the ways and has a wide bridge. All feed and thread changes can be made without changing gears.

The principal dimensions of the lathe follow: Swing over Vs, 17⅜ inches; swing over carriage, 11⅞ inches; distance between centers, 37 inches; back gear proportioned, 11.3 to 1; threads on lead screw, 6; diameter of lead screw, 1¼ inches; threads cut per inch, 3 to 64; changes of feed, 38, and net weight, 2,350 pounds.

The Middle States Co. has been organized at Erie, Pa., with a capital of $60,000 to engage in the manufacture of brass, bronze, iron and aluminum castings. The company also will handle molding sand, foundry supplies and equipment. The officers follow: M. W. Brundage, president; E. F. Shugart, vice president, and W. J. Fargo, secretary-treasurer.

A Steel and Concrete Ore Dock

Presque Isle Ore Dock of the Lake Superior & Ishpeming Railroad. The Steamer J. H. Sheadle is Berthed for a Cargo

Loading 10,000 Tons of Iron Ore An Hour

The new concrete and steel dock of the Lake Superior & Ishpeming railroad at Presque Isle, Mich., received its first train on Aug. 4, 1912, and loaded its first ore boat, the Sinaloa, on Aug. 5. This dock replaces the old wooden structure which had been in service for about 16 years. Since the building of this first dock the ore-carrying trade of the great lakes has been revolutionized and it was with difficulty that the larger class of carriers could be loaded at the dock. The modern carrier is pretty high out of the water when she is light and consequently there was not enough pitch to the spouts to make the ore flow freely.

Comparative Cost, Concrete and Steel.

Before undertaking the construction of the new dock, the relative costs of different forms of construction were considered. Estimates showed that a concrete and steel dock would cost about 167 per cent and an all-steel dock 185 per cent of the cost of the timber dock. The total cost on a long term basis, however, was found to be very much less for the concrete and steel design than for either of the others. The cost of maintenance is obviously much diminished and it is understood that cost sheets which have been compiled since the dock went into commission show that operation costs are only one-fourth to one-third of those for the old dock.

The general dimensions of the dock are as follows: The dock proper is 1,200 feet long, 75 feet above water, 60 feet wide at the bottom and 54 feet wide at the top. There is an approach fill of 1 mile in length on a 1.5 grade, a trestle 600 feet long and a tail trestle, 60 feet long. There are 200 ore pockets, ranging in capacity from 250 to 300 tons each. Four railway tracks extend the whole length of the dock.

The structure is supported on about 10,000 Norway pine and tamarack piles which are enclosed between two lines of 12-inch sheet piling. The piles are from 30 to 45 feet long, spaced from 2 to 5 feet apart in transverse rows, 3 feet apart. All of them are vertical with the exception of pairs of inclined brace piles in alternate spaces between the transverse rows. They were driven in water from 2 to 24 feet deep and to a penetration of about 20 feet in the hard, sandy bottom. All of them were driven by a 5,000-pound Vulcan steam hammer aided by a hydraulic jet at 100 pounds pressure through a 1¼-inch nozzle. They were driven at the rate of about 75 piles per 10-hour day by one floating and two land machines, and the depth of the water, the exposed situation and other conditions were such that the cost of supplies and maintenance equalled the direct labor cost for driving the piles. The pile tops were very accurately and rapidly cut off at low water level by a circular saw mounted on a vertical shaft at the extremity of the 60-foot arm of a turntable trussed platform, counter-balanced by a boiler and steam engine. The turntable was mounted on a pile driver bed sill and moved down the center of the dock, commanding the full width of the substructure and cutting a number of piles from one position.

The Piling

The lines of sheet piling inclosing the foundation piles were tied together across the top, from wale to wale with 1¼-inch tie rods and the space between filled with dredged sand. These tie rods were imbedded in the bottom of the concrete slab. The sheet piling was 12 x 12-inch Oregon fir with 4 x 4-inch hardwood strips nailed on two sides to form a dovetailed tongue and groove. After the sand filling was in place the concrete slab, dock walls and column footings were placed. The 3-foot slab was reinforced laterally and longitudinally by old wire hoisting rope. This rope was from 1 to 1½ inches in diameter and was obtained from neighboring mines at scrap prices.

A feature of the dock wall construction was the use of a steel facing plate extending from the bottom of the concrete to a height of three feet above low water. This plate is supposed to prevent the disintegration of concrete from freezing and abrasion of ice, government breakwaters in the neighborhood built only a few years ago showing the need of some protection of this sort. The total length of slab is over 1,500 feet and it was built without expansion joints. The whole

foundation is extremely rigid and is so massive that it is capable of withstanding very heavy bumps from large vessels. The work of placing the foundation slab was followed by the erection of the reinforcement for the columns, struts and bin partitions to the full height of the structure. The semi-circular bin fronts and some other parts of the steel work were not erected at this time.

The main columns of each bent are each 28 x 36 inches in size and are connected in pairs by 12-inch vertical walls. They are each reinforced by four 2½ x 2½ x ¼-inch angles, box-laced. The columns and walls which also carry load were really figured as plain concrete, carrying between 400 and 500 pounds per square inch. Slight reinforcement was put in to prevent cracking and to form a positive means of tieing the whole structure together, both laterally and longitudinally.

Forms were placed and the concrete was poured in lifts of approximately 12 feet. No expansion joints were provided in the 1,200 feet of dock, but expansion joints were placed at each end where it joins the steel trestles. The outside panels between the columns in each transverse bent are braced by solid reinforced concrete diaphragms 12 inches thick, cast integral with the columns. At each end of the dock three panels and intermediately, every seventh and eighth panel between the outside columns, are braced by single full height reinforced concrete longitudinal diaphragms intended to resist the stresses developed by braking heavy ore trains in bringing them to a stop on the dock. Although the dock has been in commission for several months, no cracks of consequence have been developed and the structure is so massive and rigid that practically no vibration from trains can be felt even when brakes are suddenly applied.

The ore bins, 54 feet long, transverse to the axis of the dock, 12 feet wide on the centers and about 30 feet in extreme depth, have A-shaped flat bottoms pitched away from the center line to discharge on both sides of the dock through two 44 x 60-inch vertical-hinged gates or doors in the semi-cylindrical steel plate ends of the bins. The transverse vertical side walls of the bins are made of reinforced concrete which fills and incloses the outside columns continued to the top of the bin to afford riveted connection for the curved end plates. Full length vertical I-beams are set in the concrete under the centers of the track stringers and there is also a reinforcement of vertical and horizontal rods.

The floor of the bin was made of concrete cast integral with reinforced concrete longitudinal beams, having triangular cross-sections which are framed into the inclined transverse concrete girders connecting the tops of the columns. The transverse girders are reinforced by riveted structural steel work which, with the column reinforcement, made a complete skeleton of the structure under the bins. Longitudinal nailing strips imbedded in the inclosed upper surface of the floor receive a wearing surface of inclined 3-inch maple planks laid parallel to the transverse walls. In the semi-circular ends of the bins the floor is covered with a steel plate riveted to vertical plates forming a short trough to which is pivoted the upper end of the steel loading chute, 35 feet long, which can be revolved through an arc of nearly 130 degrees by the suspension line attached to it near the bottom and led over a sheave at the top of the bin.

A VIEW OF ONE SECTION OF THE TOP OF THE PRESQUE ISLE DOCK

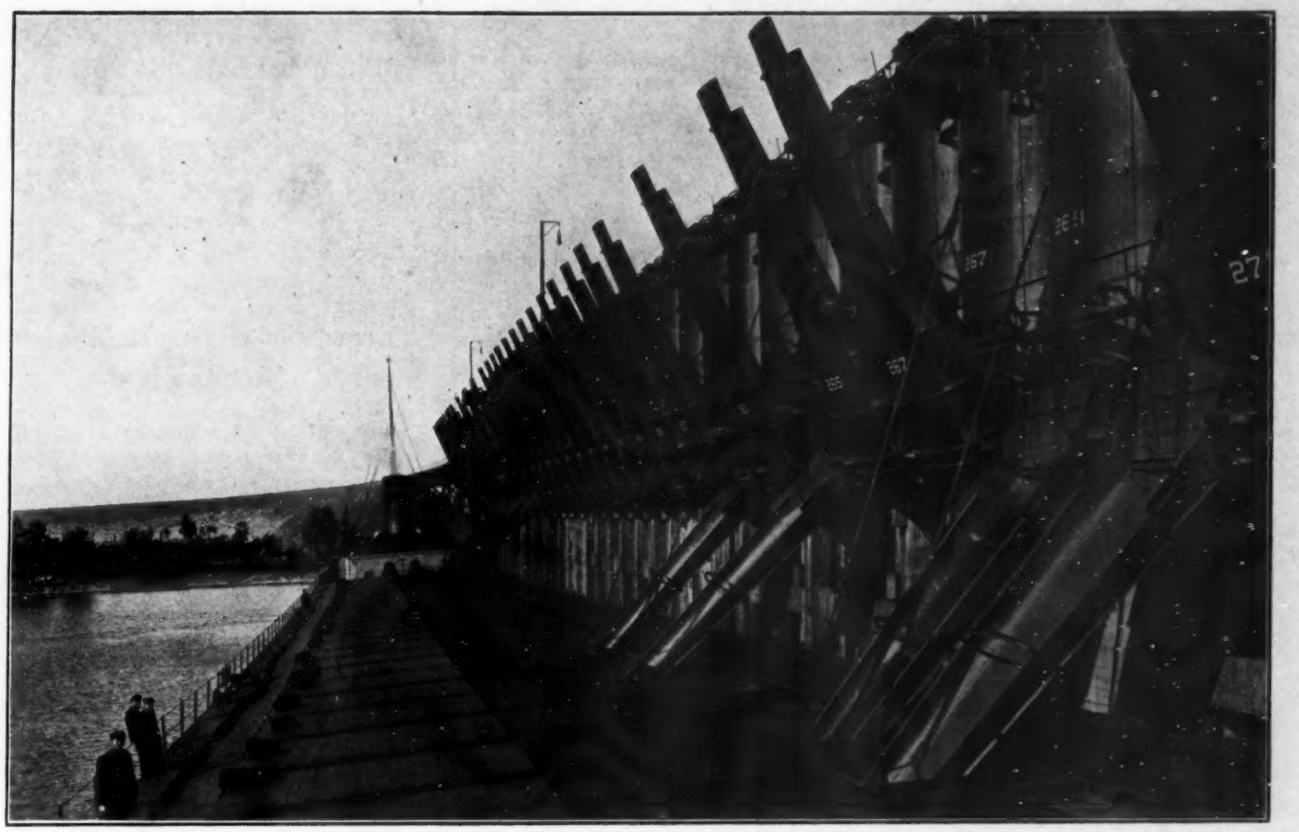
The design of the chutes and operating machinery were worked out specially for this dock and differ materially from those previously in general use. It is believed that this is the first instance in which the chute winding cable, drums, counterweight cable and swinging counterweight are laid out in such a way that the chute, which weighs 8,200 pounds, is perfectly bal-

anced in every position. Each set of six adjacent chutes on a side is operated from a 2-inch line shaft driven by a 15-horsepower motor. Each hoist is operated from this line shaft by a friction clutch. Two or more hoists on one line shaft may be operated together, the time required to raise or lower a chute being only 20 seconds. To move the chute, the operator must first release and hold the automatic brake with the left hand, and then he holds the lever of the friction clutch in operating position with the right hand. The machinery is simple and all moving parts are well protected by safety coverings.

The chute itself tapers from 8 feet, 6 inches at the upper end to 4 feet, 6 inches at the lower end with a curved bottom throughout the whole length. Many ore chutes have been built with flat bottoms, straight sides or with bends in the sides which caused the ore to stick or to spill over. This chute was designed on the theory that soft iron ore flowing with some velocity would act much the same as a stream of water. The behavior of the chute in service seems to confirm this view. When both bin or pocket doors are open the ore flows in the chute about a foot in depth apparently faster in the center and with increasing velocity towards the ends of the chute and the ore does not stick or spill over. The practical effect of this easy flow through the chute is to enable the operator to run ore to the far side of vessels 60 feet or more in width and to trim the boat perfectly. Owing to the absence of sharp angles in the pockets and the location and width of the doors, there is little poking to be done and few men are employed for this purpose on the new dock.

Since the completion of the dock no efforts have been made to obtain loading records, though some very good time has been made. On Aug. 27, the steamer Price McKinney loaded 7,733 tons of soft ore in three hours or at the rate of 2,578 tons per hour. On Oct. 24, the steamer Michigan loaded 9,692 tons of soft ore in 4¼ hours, or at the rate of 2,280 tons per hour. A portion of a cargo, 5,600 tons of soft ore, has been run into a boat in 1¼ hours, or at the rate of 4,480 tons per hour. On Oct. 29, 3,344 tons of hard ore were run into the steamer W. G. Mather in 23 minutes, only three men being actually employed in this operation. This was at the rate of 10,000 tons an hour.

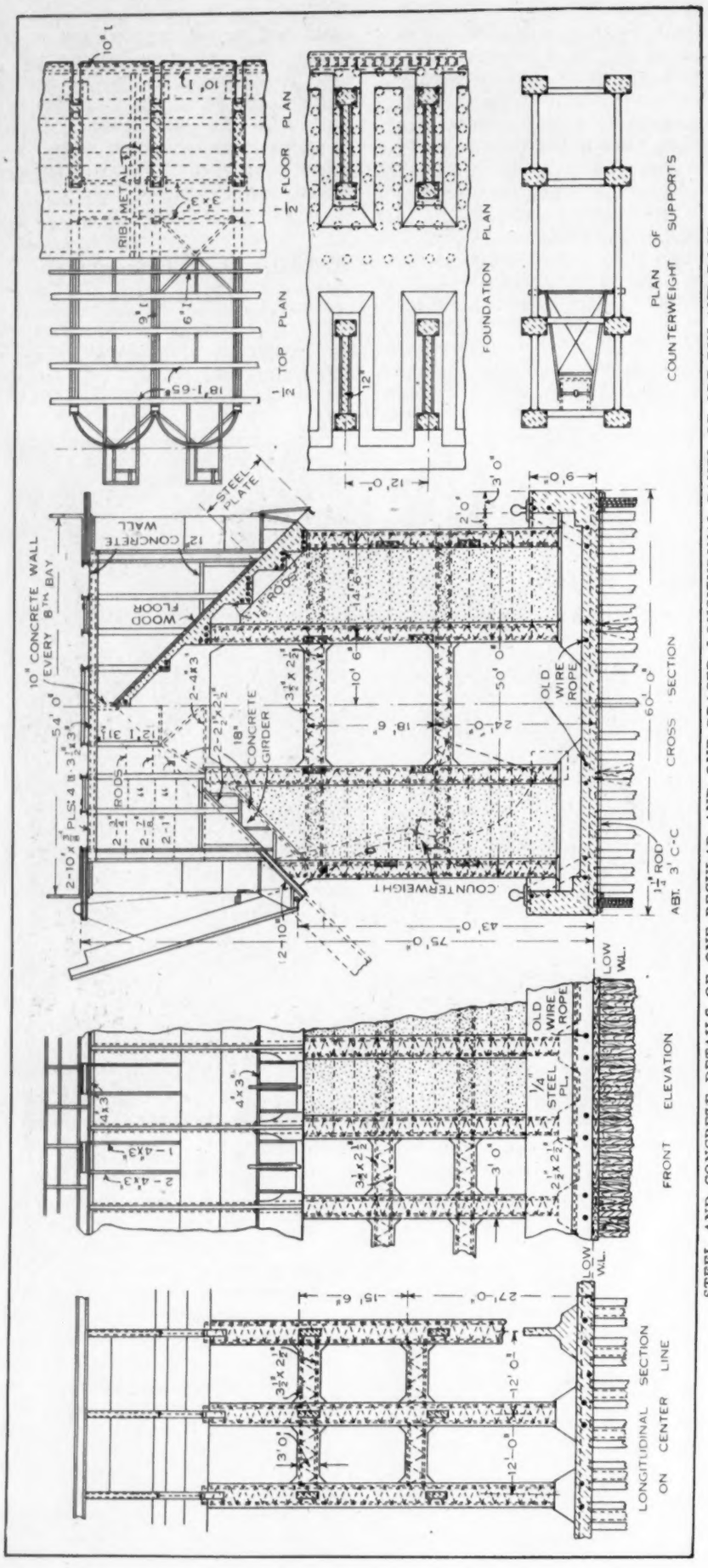
The design of the superstructure was made by B. F. Jackson, vice-president of the Wisconsin Bridge & Iron Co., and that of the substructure by R. C. Young, chief engineer of the Lake Superior & Ishpeming Railroad. J. C. Greiner was consulting engineer. The Wisconsin Bridge & Iron Co. furnished and erected the steel and machinery; the pile driving and concrete work was handled by the Raymond Concrete Pile Co., and the Zenith Dredge Co. did the dredging. The whole work was carried out under the general supervision of R. H. Harris, general manager of the Lake Superior & Ishpeming railroad.



CHUTES FROM THE PRESQUE ISLE ORE DOCK LOWERED INTO THE HATCHES OF THE J. H. SHEADLE

Utah's Diversified Mineral Industry

Utah is unique among the states in the diversity of its production of precious and semi-precious metals. It does not rank first in the production of any of these metals, but it stands well among the leaders in the production of gold, silver, copper, lead, zinc and vanadium minerals. In the production of lead and silver it ranks third; it ranks fourth in the production of copper, sixth in the production of gold, and seventh in the production of zinc. Forty per cent of the total production of the state, according to E. W. Parker, of the United States geological survey, is derived from the copper mines. The quantity of copper produced in 1911 was 142,340,215 pounds, valued at $17,792,527. The silver production was valued at $6,280,500. The principal silver-producing counties are also the chief producers of lead, the output of which was 55,198



STEEL AND CONCRETE DETAILS OF ONE REGULAR AND ONE BRACED LONGITUDINAL PANEL OF ORE BIN AND DOCK

short tons, valued at $4,967,820. Gold is the fourth in importance among the metal products of the state, and it amounted in 1911 to 217,020 fine ounces, valued at $4,486,200. About 25 per cent of the gold is obtained from dry or siliceous ores, but most of the output is obtained in the refining of copper. Some of the lead and zinc ores also produce gold.

Utah's zinc production was 7,004 short tons, valued at $798,456. The value of the metal production of Utah in 1911 was $34,325,503 out of a total value of all mineral production of $41,139,075. More than half of the remainder is obtained from coal mines, which in 1911 produced 2,513,175 short tons, valued at $4,248,666. From 250,000 to 350,000 tons are made into coke annually, chiefly from the slack produced in the coal mining operations.

The manufacture of Portland cement began in Utah in 1910, with an output of 811,800 barrels, valued at $1,005,960. The industry appears to have been overdone in the first year, for the production dropped in 1911 to 662,849 barrels, valued at $827,523.

Elimination of Titanium From Iron Ores

The bureau of mines has made a study of titaniferous iron ores, for the purpose, if possible, of devising some method of separating the titanium from the ore. If this could be accomplished, large bodies of ore in the Adirondack mountains, of New York, and Iron mountain, Wyoming, would immediately be made available. In these studies, it was attempted to separate the ilmenite, or titanium ore, from the magnetite, or iron ore, by magnetic concentration. For this purpose microscopic examination of the composition of the grains of ore was made.

The results obtained, were only partially satisfactory, in that though a certain amount of the titanium was removed, about 6 per cent remained in the concentrate, rendering the ore unfit for use except by mixing three to four parts of a non-titaniferous ore with the concentrate before smelting.

The Erie Railroad Co. recently has erected a Strauss type, single leaf, double-track, bascule bridge over the Cuyahoga river, Cleveland. This bridge replaces a 220-foot, double-track swing bridge, which formerly spanned the river, but which suffered considerable damage from a derailed train some years ago.

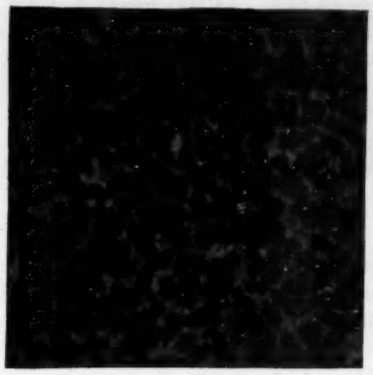


FIG. 1 — MICRO-PHOTOGRAPHS OF HEAT-TREATED CHROME-VANADIUM TIRE FROM TREAD TO BORE
(Magnification 200 diameters.)

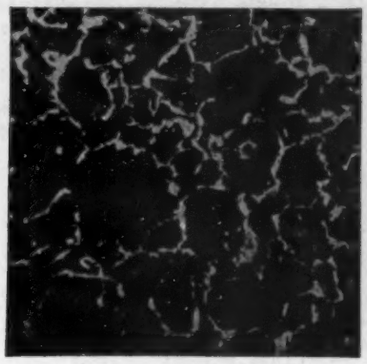


FIG. 2 — MICRO-PHOTOGRAPH OF ORDINARY CARBON TIRE STEEL, ¼ INCH BELOW TREAD
(Magnification 60 diameters.)

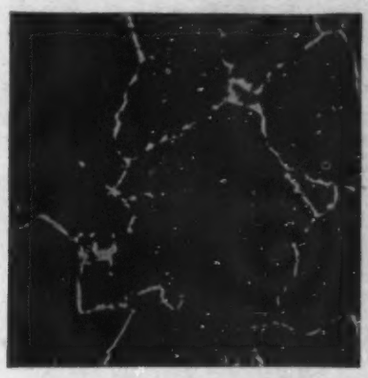


FIG. 3 — MICRO-PHOTOGRAPH OF STEEL EXISTING THROUGHOUT ALMOST THE WHOLE UNTREATED TIRE SECTION
(Magnification 60 diameters.)

Chrome-Vanadium and Carbon Tire Steels Compared

An article entitled "Chrome-Vanadium Tire Tests," published in THE IRON TRADE REVIEW, Dec. 26, 1912, page 1217, contained the service records of chrome-vanadium tires, as compared with carbon steel tires. The uniformity of grain structure of the heat-treated chrome-vanadium tire is illustrated in Fig. 1. This is representative of the microstructure of the entire tire section from tread to bore, notwithstanding that the specimen was taken from the center of the tire section, which, it is claimed, should show the coarsest grain in the entire tire. Figs. 2 and 3 are microphotographs of untreated carbon tire steel, Fig. 2 showing the microstructure of the steel close to the tread. The specimen represents the steel about ¼ inch below the tread and from that point the grain gradually becomes coarser, as indicated in Fig. 3, which is the typical microstructure existing throughout practically the entire section of the untreated carbon steel tire. The uniformity of the grain structure, Fig. 1, which extended throughout the tire section, reflects uniformly high wearing qualities.

Blair Removal Slag Pocket

In the operation of open-hearth furnaces, the filling of the slag pockets with slag necessitates the periodical cessation of operations to permit of cleaning out these pockets. It is claimed that this operation not only destroys the brickwork of the pocket, but also, the interruption in operations, adds to the tonnage cost. Attempts have been made to remedy the difficulty by providing receptacles for collecting the slag, which are placed inside of the permanent walls of the furnace structure and when filled are replaced by empty vessels. However, it has been found that the slag adheres to the walls of the structure and these receptacles cannot be removed without seriously damaging the furnace walls. In addition, the temperature in the slag pockets is too high to permit men to work in them.

The Blair Engineering Co., New York City, has designed a slag pocket which forms a removable portion or section of the furnace structure and when filled it can be removed easily and is replaced by an empty pocket. In the accompanying illustrations, Fig. 2 is a longitudinal section of one of two similar ends of an open-hearth furnace equipped with a removable slag pocket. Fig. 1 is a sectional view of the furnace at one end. Aside from the slag pocket arches and their means of support, the slag pocket structure is complete in itself. It consists of a carriage mounted on wheels, which is operated on a track at each end of the furnace, with metal posts, suitably braced, rising at intervals from the carriage bed to provide a framework for the brick walls forming the slag pockets. The lower ends of the port down-takes are metal-bound for supporting the slag pocket arches at the lower ends of the down-takes, making these arches independent of the slag pocket walls. When the slag pocket carriage is in position, a narrow opening is left between the upper ends of the pocket walls and the down-take walls, and a similar opening is left between the wall of the flue leading to the regenerative chambers and the adjacent wall of the pocket structure. These spaces are closed temporarily by brickwork to form tight joints connecting the slag pockets with the port down-takes and with the regenerative chambers.

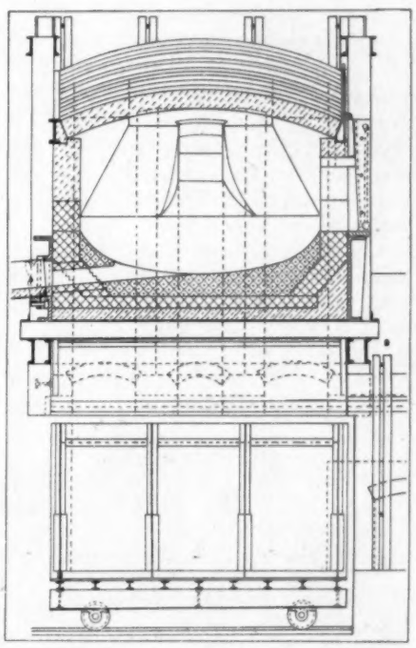


FIG 1—SECTIONAL VIEW OF ONE END OF 60-TON OPEN-HEARTH FURNACE, SHOWING SLAG POCKET CARRIAGE

When the slag pockets have become filled, the bricks are removed to destroy the bond between the carriage walls and the permanent furnace walls, but no part of the furnace structure is disturbed. The carriage containing the slag pocket then is withdrawn and is replaced by another, after which the spaces are again filled with brick.

Instead of using bricks for closing these spaces, the joint of the wall may be made by placing a layer of ganister on top of the slag pocket walls, and the entire structure can be forced against the upper portion of the walls by four screws at the corners of the carriage and by blocking in position by wedges or supports at the bottom of the carriage. As the

lift only amounts to 1 or 2 inches and as this operation takes place only once in two or three months, it is claimed that the screws are better adapted to this work than an hydraulic ram. The operation of removing the slag and restoring the slag pocket equipment in an open-hearth furnace requires only a few hours and does not necessitate rebuilding the slag pockets and downtakes, resulting in an interruption in operations from a week to ten days.

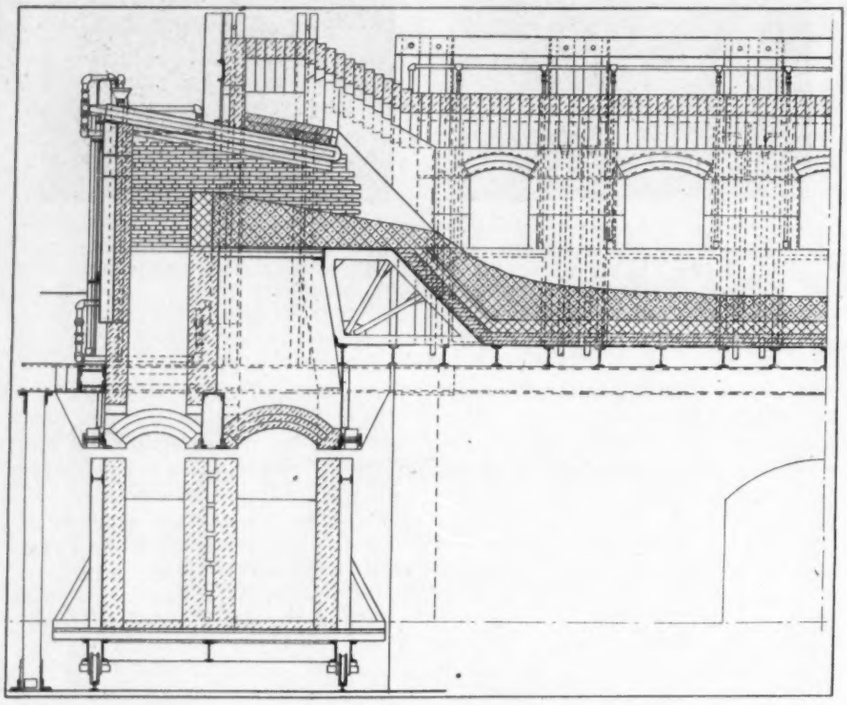


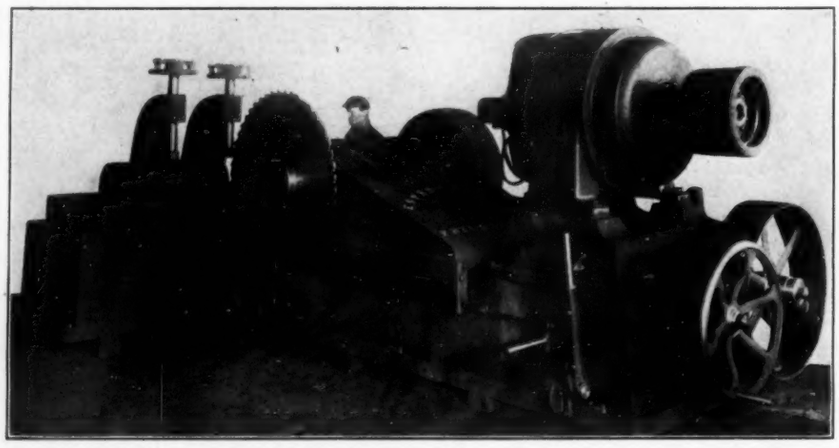
FIG. 2—LONGITUDINAL SECTION OF A 60-TON BASIC OPEN-HEARTH FURNACE, EQUIPPED WITH BLAIR INDESTRUCTIBLE PORTS AND REMOVABLE SLAG POCKETS

New Cold Saw Cutting-Off Machine

The Espen-Lucas Machine Works, Philadelphia, recently shipped four cold saw cutting-off machines, of a new type, to the Erie Forge Co., Erie, Pa. As illustrated herewith, the machine is designed especially for handling odd-shaped forgings, crankshafts and billets and when equipped with a 40-inch diameter saw blade, it has a capacity for cutting round and square bars up to 12-inch sections. The machine will cut this material at a speed of 6 inches per minute. The drive is through a main shaft, phosphor bronze worm wheel and crucible steel worm, which run in oil. The spindle extends the entire width of the saw carriage and the saw blade is bolted to the driving gear, thereby insuring rigidity and eliminating torsional strains between the gear and the saw blade. The feed of the saw carriage is from ½ inch to 6 inches per minute, which is obtained by friction plates controlled by an automatic-locking hand lever and by which any change in cutting speed may be effected while the machine is in operation. The same lever also controls the quick-return mechanism of the saw carriage. An atuomatic carriage stop also is provided.

Any type of saw blade, including the inserted-tooth or solid high speed steel, can be used. Either compressed air or screw clamps are furnished for the rapid handling of stock where multiple cuts are to be made and the machine is equipped with a stock feed adjustment of sufficient capacity to handle bars 12 inches in diameter and of any length up to 20 feet. A reservoir has been substituted for the usual drip pan and it is located in the concrete foundation, which forms a drain to the reservoir and is located at a point accessible from the rear of the machine.

In practice, this machine has cut steel billets 10 inches square, containing carbon from 0.35 to 1 per cent, in 4 minutes and 50 seconds; 12-inch steel bars of the same carbon content have been cut in 6 minutes; 9-inch steel bars, 3 minutes; 6-inch steel bars, 1 minute and 27 seconds; round billets, 5½ inches in diameter, 50 seconds; round billets, 3½ inches in diameter, 27 seconds, and steel bars, containing 0.45 per cent carbon, 3.5 per cent nickel and 9 inches in diameter, have been cut in 3 minutes and 27 seconds. The machine illustrated is driven by a 25-horsepower motor and weighs about 30,000 pounds.



COLD SAW CUTTING-OFF MACHINE BUILT BY THE ESPEN-LUCAS MACHINE CO., PHILADELPHIA

Heat Control in Over-Fired Furnaces

Over-fired furnaces, in which combustion occurs above the heat chamber and in which the fire gases are discharged downwardly from the combustion chamber into the heating chamber, are regulated quickly and accurately, but with greater difficulty than direct-fired furnaces. Wirt S. Quigley, of Rockaway Park, N. Y., has patented a device to control the heat of such furnaces by providing a regulating relief passage in the top of the combustion chamber, which can be closed or partially or wholly opened. When opened, the heat is permitted to escape from the combustion chamber without passing intc or through the heating chamber.

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Jan. 4.

Pig Iron.—The year has opened with promising conditions prevailing in the pig iron trade. For a few days last week the warrant market gave way a little, apparently because a certain amount of pig iron was added to stock during the holidays. Already the market has made a complete recovery and higher prices are obtainable, even upon the figures prevailing before Christmas. Yesterday's sales for Cleveland iron were 67s 10½d ($16.62) for cash, 68s 4d ($16.72) one month and 68s 11d ($16.86) three months. The amount in store is 241,000 tons. There is plenty of demand for forward deliveries and the small quantity put in stock is melting away. Everything points to a heavy demand for raw material. In Manchester, the market is especially strong and higher prices are considered certain for Northampton, Derbyshire and Lincolnshire pig iron. The sellers at Birmingham, on Thursday, were able to command a rise of 1s on the selling figures prevailing before the holidays. Coke is so scarce that a number of furnaces ready to start cannot be lighted for want of fuel, and, except in the northwest district, it is practically impossible to increase supplies. It is very likely that quarter day next week will see some heavy buying, as a number of consumers are now obliged to come into the market.

Finished Iron and Steel.—The occurrence of bank holiday, on Thursday, prevented a meeting last week and this week's meeting was accordingly invested with special interest. Recent buoyant conditions continue. In the steel trade, demand has overtaken supply in all departments, billets being especially in great demand. There is some talk of a further rise in finished steel, in view of the high price of billets. A large number of contracts run out at the end of the year, and, quite commonly, consumers will have to buy at advances of 25s to 35s per ton upon contracts made nine or 12 months ago. Believing the market to be inflated, they are placing orders of the smallest possible proportions. The volume of output tends to increase, but is not yet equal to demand. At the Birmingham meeting an advance was declared of 10s in the price of wire, and, as this trade is in a strong position, further advances are looked for. Wire manufacturers are acting together with unanimity to a greater extent than for many years past. They claim that the advances so far declared barely cover the additional cost of wire rods, which are still difficult to obtain. It is generally expected, therefore, that other advances are to be looked for shortly. In the galvanized sheet trade, further weakness has been manifested, so that sheets can now be bought for £12 or thereabouts where good contracts are offered.

BELGIAN IRON TRADE

Brussels, Dec. 26. — The tone of the Belgian iron and steel trade continues to be very good in respect to the actual situation. The factories, as has been so frequently noted, are busy and will remain so for some time, and were the situation to be gaged by the activity prevailing in the works themselves, nothing but most gratifying views could be entertained as to the near future of the iron business in Belgium. But to gage the situation apart from the present it is into the counting houses we must look, and it is there we find obvious signs of want of confidence on the part of buyers. Business when done is not done so easily as before, and is done on a more restricted scale, and frequently with the feeling that political circumstances may arise which will justify the buyer in asking the works not to execute the order.

GERMAN IRON TRADE

Berlin, Dec. 26. — Activity still prevails in the German pig iron market both for domestic and foreign consumption. According to an official report issued by the Pig Iron Syndicate, considerably larger quantities have been booked by home consumers for the first half of the year than was the case a year ago. The export demand is running particularly on phosphorous iron. Furnaces are hard pressed with calls for delivery on specifications. Half products are also in active demand and firm. The market for finished products has on the whole fairly well withstood the influence of the war and the political uncertainty, and apart from limiting orders for new business no vital interests were disturbed and prices on the whole well maintained. The German railway department has received tenders for the supply of bar iron at the parity of 116.50 marks ($27.38), or about 7.50 marks ($1.76) below the current quotation, a drop which is generally repudiated by the trade as unjustifiable in present market conditions. Prices in most departments tend upwards. Pig iron in Silesia for the first quarter of 1913 has been advanced 4.50 marks ($1.06) per ton. English hematite is now quoted 100 marks ($23.50) to 102 marks ($23.97) against 98 marks ($23.03) to 100 marks ($23.50) previously, and hoop iron is about 2.50 marks (58.75 cents) per ton higher, but otherwise no variation in the official price list has occurred.

RUSSIAN IRON TRADE

(*Special Correspondence*)

St. Petersburg, Dec. 26. — The regular congress of the South Russian Mine Owners is now being held when the business of the past year is reviewed and, what is more important, that of the coming year is provided for. It is the occasion, so to speak, when not only stock taking is done, but the capacities of the works are measured and the producers of the South Russian mining and metallurgical districts are made aware of what they are expected to do in the following year. The congress is of particular value from this point of view, and also from that of wagonage; for the railway department, being put into possession of the probable requirements of the district during the ensuing 12 months, is enabled to, and generally does, make such provision for conveyance of goods as lies within its power so well ahead that the producers, including iron and steel manufacturers, know in advance what accommodation there will be for them on the railways. The labor question during the past year has been a very grave one for South Russian mines and metal industries; and, although the number of workmen available may now be ample for normal business they are quite unequal to the demands made on the district under the stress of the present trade inflation. The metallurgical works of the district will suffer for some time through shortage of fuel.

THE IRON TRADE REVIEW

DEVOTED TO THE IRON, STEEL, MACHINERY AND FOUNDRY INDUSTRIES

Published Every Thursday by

The Penton Publishing Company

CLEVELAND

CHICAGO - - - - - - - - - - 1328 Monadnock Blk,
CINCINNATI - - - - - - - - 503 Mercantile Library Bldg.
NEW YORK - - - - - - - - - - 1115 West St. Bldg.
PITTSBURGH - - - - - - - - - 2148-49 Oliver Bldg.
WASHINGTON, D. C. - - - - - - 501 Metropolitan Bank Bldg.
BIRMINGHAM, ENG. - - - - - - - Princes Chambers

Copies published three months or more previous to date of current issue, 25 cents each

All communications relating to changes of advertising copy, discontinuances, etc., must be received ten days prior to the next publishing date.

Subscription, United States and Mexico $4.00 per year.
Canada and other Foreign Countries $5.50 a year

Entered at the Postoffice at Cleveland as Second Class Matter.

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Cleveland, January 16, 1913

Putting Teeth Into the Sherman Law

Recent decisions of the supreme court have strengthened the Sherman anti-trust law in some very important respects. After the decisions in the cases of the Tobacco and Oil companies, so-called dissolution or disintegration took place, but it was generally believed by the public that very little actual change had taken place in the management and control of these great companies. Whether the judges of the supreme court have doubts as to the efficacy of the dissolution of the tobacco and oil companies, is not clear, but in a decision rendered a few days ago the court refused to assent to a distribution of the Union Pacific Co.'s holdings of Southern Pacific stock to Union Pacific shareholders,.because such action might result in practically the same control continuing, thus preventing real competition between the Southern Pacific and the Union Pacific. In making the decision, Justice Vandeventer says that so far as is consistent with proper enforcement of the law, the court should conserve the property interests involved, but never in such wise as to sacrifice the object of the statute. He declares that no form of dissolution shall be permitted that in substance or effect amounts to restoring the combination which it was the purpose of the decree to terminate.

In another very recent decision, the supreme court dealt with the attempt of certain operators to engineer a corner in cotton in 1910. The court finds that corners are expressly included within the provisions of the law. Judge Vandeventer said that control and enhancement of prices were features of a conspiracy, upon the attainment of which its success depended.

Keeping in mind these decisions, and recalling the decision made a few weeks ago in the case of the Union Pacific holding stock in the Southern Pacific, in which the court held that the *power* to suppress or stifle competition, or create monopoly, determines the applicability of the Sherman act, it will be seen that the Sherman act as supported by these recent decisions has much greater potentiality than either its friends or those who condemn it suspected. It is not even necessary to exercise power. The *possession* of power to suppress competition is in contravention of the law.

Corporation's Orders Tripled

The unfilled orders of the United States Steel Corporation have tripled in two years, standing at 2,674,757 tons on Jan. 1, 1911, and at 7,932,164 tons on Jan. 1, 1913, the increase being 5,257,407 tons, or 200 per cent. The increases by quarters have been as follows:

Increase in Steel Corporation's Unfilled Tonnage

Quarters:—	1911.	1912.
First	772,544	220,080
Second	86,243*	502,505
Third	250,259	744,161
Fourth	1,473,444	1,380,657
Year	2,410,004	2,847,403

*Decrease.

Many in the trade will probably be surprised to note that the increase in 1912 was only slightly greater than in 1911, 437,000 tons or 18 per cent. The year 1911 did not make the impression of being a good year, while 1912 did. It was the heavy accumulation of business taken by the mills in the closing months of 1911, which formed the foundation for the 1912 activity, and particularly for the price advances. The advances in finished steel prices occurred almost wholly during the second and third quarters of 1912. It will be observed that the Steel Corporation booked business very freely at the low prices, in the fourth quarter of 1911, but then, having an excellent foundation, rather refrained from selling freely until practically the top was reached, when, in the quarter just ended, it booked very freely again.

There has been a great change in the character of the business on books, with respect to the amount actually specified. On Jan. 1, 1911, when unfilled orders amounted to 2,674,757 tons, there was probably only a small proportion in the form of actual specification, and this statement would also hold good for the 5,084,761 tons on Jan. 1, 1912. At that time, the mills were able to make reasonable prompt shipment. At the present time, probably more than 40 per cent of the total tonnage obligations are in the form of actual specifications. There is, besides, a large tonnage which, while not actually specified, is certain to

be specified in due course, simply as present specifications are filled. That is the case with car material, and is largely the case with structural material required for many large jobs. The deliveries are reserved and the specifications will be furnished in due course well before deliveries begin. It is safe to estimate that much more than 50 per cent of the 8,000,000 tons on the books of the Steel Corporation is in the form of actual tonnages and much less than 50 per cent in the form of the familiar requirement contract. This is a better showing than was ever made before.

The Sheet Bar Situation

What was predicted several weeks ago has actually taken place. Some of the sheet and tin plate mills are unable to secure a sufficient supply of sheet bars and will be forced to operate intermittently or lightly for weeks or perhaps months to come. Last month and even longer ago, there were occasional losses of time by these mills, but the losses were negligible in proportion to the total operations. In the current quarter, they are certain to be of considerable importance, representing an important tonnage of production actually lost, and which the market would readily absorb.

Upon several occasions in the past dozen years, sheet bars have been scarce, and extremely scarce, but no condition precisely paralleling the present has ever before occurred. In 1902, for instance, both billets and sheet bars were extremely scarce, but then there were large importations, chiefly at a duty of $6.72, although some of the material was valued at a price which made the duty still higher. Today importations are out of the question, on account of the condition of markets abroad, and indeed many inquiries have lately come from abroad to this side.

Ordinarily the law of supply and demand regulates market matters of this sort, but that law cannot regulate the present situation, because there is not an open market in the full sense, for there is the restraining influence upon finished steel prices exerted by many large steel manufacturers, whereby those prices have not advanced as much as they would have advanced had fully open conditions prevailed. Pressure has been exerted to keep finished steel prices from advancing, whereas there is not an equal pressure exerted to prevent unfinished steel prices from advancing. Such pressure could only be exerted by producers continuing to offer steel, and for them to do this would involve their curtailing their output of finished product. There are no mills making billets or sheet bars for the market as their principal output.

This condition is a development of relatively recent years. The time was that mills were built for the purpose of selling billets, and later of selling sheet bars. Nearly two decades ago, the 4-inch billet was pronounced one of the greatest of American inventions, and naturally mills were built to produce it as a commodity, but in recent years billet and sheet bar mills have been built only to supply the producer's own requirements, those sold being merely surplus output. When the producer's own finishing mills are pressed to make their maximum tonnage, the surplus for the market is naturally reduced.

The regularly operative independent sheet and tin plate plants have a total of approximately 400 hot mills, about five-eighths of these being sheet mills. As to steel supply, about 45 per cent of these sheet and tin mills have attached steel mills, while 55 per cent must buy their steel.

There are no sources of supply which may be regarded as strictly regular, since in all cases the sheet bars offered are substantially a surplus product, and it is perfectly natural that when the surplus product decreases at the very time when steel is most called for, there should be a scarcity.

The length to which this scarcity of sheet bars has gone is strikingly illustrated by the fact that some of the producing interests which ordinarily sell sheet bars regularly or intermittently have actually been canvassing the market lately with a view of making purchases, and this statement includes the Carnegie Steel Co. itself, which, besides supplying its brother subsidiary in the Steel Corporation, the American Sheet & Tin Plate Co., has regularly supplied a large tonnage of sheet and tin plate bars to independent mills.

A peculiar feature of this interesting situation is that the market offers no promise of an improvement in the supply. Usually when prompt material is scarce in a market, there are offerings for later delivery, but at this juncture there are no such offerings. The mills which cannot make early deliveries refuse to discuss the question of later deliveries, such deliveries as it would be physically possible for them to make. To do so would be to sell their unfinished product for a delivery farther ahead than they are willing to consider in the case of their regular finished products.

It is curious that the building of steel mills is not stimulated by these conditions. While there is a natural hesitancy about building a plant when the supply of raw material is uncertain, it would seem to be less risky, considering the alignment of prices, to build a steel mill and depend upon the market for pig iron, than to build a sheet mill and depend on the market for sheet bars. Assuming that the market for sheet bars is $29, Pittsburgh or Youngstown, the spread between sheet bars and sheets or tin plates, at current prices, is no greater than the actual cost of manufacture. There is no profit. On the other hand, there is a spread of $12 a ton between basic pig iron and sheet bars, which is quite measurably in excess of the cost of conversion. Furthermore, scrap is low relative to pig iron, which itself is low relative to steel.

A damper is cast upon the idea of building a steel mill to use merchant pig iron by reason of the fact that direct metal involves a saving of at least a dollar a ton in conversion as compared with cold pig iron and in a try-out the detached steel mill would be at a disadavantage. A year ago this disadvantage seemed great; today it seems almost negligible. A continuance of present market conditions for only a few months will likely result in definite developments towards additional new construction.

POWER OF CORPORATION

Feared in Case Tariff is Reduced—Hearings at Washington.

The ways and means committee of the house of representatives heard testimony of representatives of iron and steel industries at Washington on Jan. 10 and 11.

E. R. Crawford, of Pittsburgh, president of the McKeesport Tin Plate Co., represented the independent tin plate mills. Mr. Crawford offered a compromise suggestion of a tin plate tariff of 85 cents a ton and was sharply cross examined. He explained that 98 per cent of tin plate was thin steel. He said that if the tariff was cut so that foreign competitors of the Steel Corporation were let in he feared that Corporation would retaliate by adjusting things so as to crush foreign competition, and that the independents here would go down with the foreigners.

"The United States Steel Corporation," he added, "simply suffers us to do business. It is strong enough to put us out of business in less than a week if it cared to."

"Do you think," asked Representative Palmer (Dem.), of Pennsylvania, "that we ought to legislate on what you fear or on the basis of the contrary history of the last 11 or 12 years?"

"You might put a weapon in their hands to enable them to make a price to keep out foreign producers, with whom we might go down," returned Mr. Crawford.

Mr. Palmer responded by asking if the witness thought there was any danger in the present state of public mind of the Corporation driving the independents out of business. The witness said that a tariff reduction in favor of foreign competitors might give the Corporation "an excuse" to drive out competition, and that he wanted the tariff to keep that excuse away from the Corporation.

He believed that the Steel Corporation "has steel-producing capacity today greater than Great Britain and Germany combined, and that with all that it represented 65 per cent of the steel-producing capacity of this country"; that it could defend its position absolutely even if the tariff was wiped out; that it felt absolutely secure and "can take care of itself from legislation, no matter what may arise." He said there was a shortage of steel today and that the Corporation was "at the helm." What he was afraid of was that the Corporation would go out after the California market.

"There goes the ghost of the Corporation again," said Representative Palmer, scornfully.

Mr. Crawford said nearly all tin plate was produced in the Pittsburgh district and that the principal consumption was at or near the seaboard, where the industry was easily attacked by ocean rates. On the Pacific coast the Germans could get the trade because of low ocean rates.

"Under the rate the Democratic bill gave you last year," asked Representative Palmer, "you would be left in sole enjoyment of the Atlantic coast consumption of tin plate?"

"Yes, under present conditions."

"Eighty-five cents a hundred pounds tariff would give the American manufacturers an absolute monopoly of Atlantic coast, New Orleans and inland markets—everything except the San Francisco market?"

"Yes, under existing conditions."

"You have had a prohibitive tariff on tin plate since the industry began," remarked Mr. Palmer.

Representative James also put in a question.

"Do you think," the representative asked, "that the Steel Corporation ought to be subsidized to the extent you advocate in order to enable the independents to do business?"

"I don't regard it as a subsidy," returned Mr. Crawford.

Joseph Auerbach, of New York, representing the metal ball-bearing interests, protested against any disturbance of the present tariff on ball bearings.

The Standard Chain Co., of Pittsburgh, according to testimony of John C. Schmidt, its president, would not object to a 13 per cent tariff on chains.

Pleas for retention of present tariff rates were made by B. A. Levett, of New York, in behalf of manufacturers of tungsten lights; James L. Gitterman, of New York, for bottle caps, and C. A. Curtiss, of Meriden, Conn., for table cutlery.

Henry R. Towne, of Stamford, Conn., representing, he said, practically all of the $30,000,000 hardware industry, recommended reducing the tariff on locks and building hardware by the adoption of a sliding scale, cutting, if necessary, first from 45 per cent ad valorem to 40 per cent, later 35 per cent, and finally 30 per cent. He suggested this to avoid any sudden disturbance of business. He said there was no trust, no monopoly, no control of that industry.

BUTLER'S BRIEF

Protests Against Further Downward Revision of Tariff.

The independent blast furnace owners in the middle west, particularly of the Mahoning and Shenango valleys, through J. G. Butler Jr., vice president of the Brier Hill Steel Co., Youngstown, O., have filed a brief with Chairman Underwood, of the ways and means committee of the house of representatives, protesting against further reduction of the tariff on pig iron. The brief is supplementary to the brief which Mr. Butler filed with the house ways and means committee Jan. 20, 1909, and briefs filed before the senate finance committee April 29, 1909, and Feb. 27, 1912. The last named brief was published in full in THE IRON TRADE REVIEW, Feb. 29, 1912. Mr. Butler calls attention to the fact that since filing his last brief there have been large advances in the wages of labor in the coke regions, iron ore ranges and at the furnaces. Wages in the United States and England, of blast furnace workers, are given as follows:

	United States.	England.
Furnace keeper	$2.90	$1.82
Top fillers	2.55	1.27
Cinderman	2.30	1.21
Bottom fillers	2.30	1.12
Laborers	1.65	.91
Blast enginemen	2.90	1.37

Mr. Butler states that the independent furnace men believe they have stood their full share of tariff reduction. He gives the rate from 1890 down to the present time as follows:

	McKinley Act, 1890.	Wilson Act, 1894.	Dingley Act, 1897.	Payne Act, 1909.
Pig iron	$6.72	$4.00	$4.00	$2.50

PER CENT REDUCTION

	Wilson Act, 1896.	Dingley Act, 1905.	Payne Act, 1910.—1911.
Pig iron	22.45	27.95	16.87 — 15.66

Mr. Butler objects particularly to the ad valorem duty, saying that experience has demonstrated that in the years of depression the profits are at a minimum. During these years, protection from importation is absolutely necessary. At that time, however, they would be deprived from protection because the ad valorem duty reduces the tariff to a minimum, but a specific duty would work in the nature of a balance wheel in the case of pig iron becoming scarce.

Mr. Butler calls attention to the fact that under the Payne act the duty on scrap was reduced from $4 per ton to $1 per ton and every ton of scrap imported takes the place of a ton of pig iron. There is grave danger of fraud upon the revenues by so-called scrap, which is not really scrap, coming in under the low tariff.

GERMAN COMPETITION

Keenly Felt by Machine Tool Makers —Brief is Filed.

A brief, signed by 112 machine tool manufacturers, has been submitted to the ways and means committee of the house of representatives, asking that the present tariff of 30 per cent on machine tools be not lowered and that in any event they should be returned to the general clause, "articles or wares not specially provided for," in which clause machine tools were included in every tariff act previous to the Payne law, which placed them in the paragraph with cash registers, typesetting machines, steam engines, printing presses, sewing machines and typewriters. The brief states that the general clause embraces the great bulk of metal working and engineering enterprises competing with the machine tool manufacturers for the same class of labor and the same class of material.

The brief asserts that 10 years ago there was no particular menace in foreign competition for the machine tool industry, but during the past 10 years, foreign competitors have made wonderful advances, especially in England and Germany, and today they have so perfected their product and the process of manufacture that Germany, especially, has not only supplied the demands of her own market, but has rapidly gained in the machine tool export market of the world, where she meets in competition the American manufacturer of machine tools. "Our foreign competitors," says the brief, "can today undersell us on their product laid down in New York, before the duty is applied, on the average from 30 to 40 per cent on the basis of prices now charged for these foreign machine tools in the foreign countries."

As to costs, the brief states that 25 per cent is for material, and it is probable that the foreign manufacturer has no special advantage over the American in this item, but in labor and overhead costs comprising the remaining 75 per cent, the foreign manufacturer has decided advantages, growing chiefly out of the fact that the wages paid for equivalent work average about one-half.

As an illustration of the ability of German competitors to drive Americans out of a mutual field, the brief states that in 1900 America and Germany exported machinery and machine tools to France to the value of about 35,000,000 francs each, but in 1910, Germany sold France machinery and machine tools valued at 110,000,000 francs, while the American sales to France amounted to only 45,000,000 francs. All foreign countries except England maintain a tariff against American machine tools.

The brief calls attention to the fact that in the Underwood bill of the last session, all materials which enter into the construction of a machine tool, such as pig iron, steel bars, etc., carried a tariff rate, while the finished products, machine tools, were placed upon the free list.

TARIFF REVISION

Favored by General Manager of Nova Scotia Steel Co.

In a review of the steel trade of the year Thomas Cantley, general manager of the Nova Scotia Steel Co., makes a plea for a re-adjustment of the iron and steel schedules of the Canadian tariff. Referring to the tariff issue Mr. Cantley said: "In order that Canada's iron and steel producing capacity should more nearly keep pace with the consumption and requirements of the country it is necessary that there should be at once a readjustment of the Canadian metal tariff. How inadequate the present tariff conditions are to enable our domestic producers to meet their largely increased labor, assembly and distribution costs as compared with those of foreign competitors, is abundantly evident from a very cursory examination of the question."

The Canadian tariff is now being revised but only so far as it affects the West Indies reciprocity treaty. The steel industries, however, are bringing pressure to bear on the government to have the proposed changes in the tariff made this session, and are naturally taking a lot of interest in the free list of the Underwood metal revision bill.

Second Annual Dinner

On last Thursday evening, Jan. 9, the Michigan Bolt & Nut Co., Detroit, gave a dinner, the second of its kind, to its foremen and heads of departments. The improvements within the company's plant which have been effected within the past year, were reviewed, and some of the developments planned for the coming year outlined and discussed. The company is so well pleased with the benefits resulting from the two dinners already given, that it has been voted an annual affair.

NEARLY EIGHT MILLION

In Unfilled Tonnage Now Upon Steel Corporation's Books.

The month of December added 79,281 tons to the unfilled orders of the United States Steel Corporation, according to the monthly announcement made Jan. 10. The total orders upon the Steel Corporation's books at the end of the year 1912 were then reported as 7,932,164 tons, compared with 7,852,883 tons on Nov. 30. The present bookings are the fourth highest in the history of the Steel Corporation, being exceeded during the third and fourth quarters of 1906, and the first quarter of 1907, when the totals were 7,936,884 tons, 8,489,718 tons and 8,043,858 tons, respectively.

Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentages of increase or decline from the previous month, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Dec. 31, 1912....	7,932,164	79,281+	1.01+
Nov. 30, 1912....	7,852,883	258,502	3.40+
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sept. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206,296+	3.46+
July 31, 1912....	5,957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56,363+	0.98+
May 31, 1912....	5,750,983	86,583+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942,806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sept. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,162+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sept. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—

Annual Banquet of Engineers

The Engineers' Society of Western Pennsylvania has announced its program for the annual banquet of the organization, to be held Monday evening, Jan. 27, at Hotel Schenley, Pittsburgh. A reception will be held at 6:15 o'clock and the banquet will begin at 6:45 o'clock.

Among the speakers are: F. Hopkinson Smith, engineer, author and artist, and Charles M. Schwab, president of the Bethlehem Steel Co. John A. Brashear, engineer, astronomer and educator, will act as toast master.

Members of the entertaining committee are: A. R. Raymer; L. J. Affelder and George H. Neilson. Elmer K. Hiles, secretary, 2511 Oliver building, requests that reservations be made as quickly as possible.

MEN OF THE IRON TRADE

H. S. Willard, president of the Wellston Steel & Iron Co., Wellston, O., is spending the winter in California.

Samuel S. Smith has severed his connection with the Enterprise Iron & Metal Co., Grand Rapids, Mich., and started a scrap yard.

Huntly R. Drummond, of the Drummond-McCall Iron Co., Montreal, Que., has been elected president of the Montreal board of trade.

W. C. Silverthorne, secretary of the Northern Chief Iron Co., Wausau, Wis., has retired from the bench after 16 years of service as a judge.

H. Laurel, formerly secretary of the Co-Operative Stove Co., Wheeling, W. Va., has resigned and has been succeeded by H. E. Young.

Frank R. Rhodes, of Eaton-Rhodes & Co., pig iron and coke brokers, of Cincinnati, recently returned from an extended trip to Cuba and Panama.

H. J. Fuller, head of the Canadian Fairbanks-Morse Co., has been reappointed president of the Montreal, (Que.) Metal and Hardware Association.

M. L. Mozier, formerly secretary and treasurer of the Penn Iron Co., Erie, Pa., has accepted the position of secretary of the Alton Steel Co., Alton, Ill.

L. B. Lamb, formerly of the Bettendorf Axle Co., Bettendorf, Ia., has become associated with the Hart-Parr Co., Charles City, Ia., in the steel foundry.

A. S. Dowler, formerly superintendent of the St. Louis Car Wheel Co., St. Louis, has been appointed superintendent of the Centre Foundry & Machine Co., Wheeling, W. Va.

John Turnbach, Wilkesbarre, Pa., has been appointed general superintendent of the West Pittston, Pa., plant of the Vulcan Iron Works, succeeding the late Thomas B. Mitten.

Frank O. Hardy, of the William A. Hardy Sons Co., brass foundry, Fitchburg, Mass., was inaugurated mayor of that city, last week, for his second term.

Charles Johnson has been re-elected president of the Escanaba River Land & Iron Co. Other officers re-elected at the annual meeting held at Negaunee, Mich., last week, were George J. Mass, vice president; J. H. Winter, secretary and treasurer. The company owns the fee of the Austin mine, which is being operated by the Cleveland-Cliffs Iron Co., Cleveland.

George H. Beidel, who has been acting general storekeeper of the plant of the Pennsylvania Steel Co., at Steelton, Pa., has been appointed assistant purchasing agent at Philadelphia.

P. H. Gallagher, Akron, has been appointed superintendent of the Niles Forge & Mfg. Co., Niles, O., succeeding B. J. Rosensteel, who has been named traveling salesman for the company.

Arthur Appleton is now the representative in the New York territory of the Toledo Bridge & Crane Co., Toledo, O. Mr. Appleton succeeds H. L. Drullard and has offices at 52 Broadway.

Fred Peiter, formerly assistant managing engineer of the H. Koppers Co., Chicago, has been engaged to take charge of the designing and constructing departments of the Gas Machinery Co., Cleveland.

Edward Aylward has disposed of his interest in the Aylward Sons Co., Neenah, Wis., manufacturing catch basins and iron work, to his brothers, and proposes to locate elsewhere in another line of business.

Robert D. Cunningham, for several years superintendent of the foundry department of the Deane Steam Pump Co., Holyoke, Mass., has assumed the position of manager of the Humphrey Machine Co., Keene, N. H.

Charles M. Loring, for seven years assistant treasurer of the J. I. Case Plow Works, Racine, Wis., has resigned his position to become treasurer of the Stowell Mfg. & Foundry Co., South Milwaukee, Wis.

R. Bowen, who for some time past has been general sales manager of the Epping-Carpenter Co., Pittsburgh, manufacturer of pumping machinery and condensers, has been appointed general manager of the company.

Samuel T. Park, formerly superintendent of motive power of the Queen & Crescent railroad, at Danville, Ky., has been elected to the position of president of the Monarch Pneumatic Tool Co., St. Louis.

O. R. Hamilton, Iron River, Wis., has been appointed special engineer to assist the tax commission and the state geological survey in making the appraisal of the mining properties of Wisconsin, by State Geologist Allen.

Howard Longstroth, president of the Rittenhouse Trust Co., Philadelphia, has been named treasurer of the Lebanon Valley Iron & Steel Co., Lebanon, Pa., succeeding F. T. Davis, resigned, and has taken up his new duties.

W. R. Beatty, of the W. R. Beatty Machinery & Equipment Co., Pittsburgh, has been appointed manager of sales at Chicago for Williams, White & Co., of Moline, Ill., with offices at 933 Monadnock building, Chicago.

Stewart Barry and R. Russell Walker have been admitted into partnership in the firm of William Jacks & Co., dealers in metals, 5 East India avenue, London, Eng. They have been associated with the firm for many years.

George P. Flinn, representative in Boston, Mass., of Ernst Wiener Co., 50 Church street, New York, designer and builder of Wiener industrial railways, now has his office at 201 Devonshire street, Boston. He is a resident of that city.

J. E. Fitzgerald, who has been identified with the sales department of the Brier Hill Steel Co., Youngstown, O., since last June, has resigned and has taken a position as assistant to the president of the Augustine Rotary Engine Co., Buffalo.

J. Royden Thomson, a member of the shipping house of William Thomson & Co., has resigned to accept the position of managing director for the Maritime Motor Car Co. The company's factory is now nearing completion at St. John, N. B.

J. A. Hefelfinger has been appointed superintendent of the open-hearth department of the plant of the Allegheny Steel Co. at Brackenridge, Pa., and William Galbraith superintendent of the bar mill, to succeed Archie Smith and Andy Cullen, respectively.

O. L. Remington, managing director of the William McLean Co., Melbourne, Australia, is making a trip through the United States for the purpose of posting himself on the newest machinery and methods of plant management. This week Mr. Remington

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has been devoting himself to plants in and around Chicago, including that of Joseph T. Ryerson & Son.

Myron Phillips, formerly superintendent of the lower Carnegie mills, at Youngstown, O., has been appointed general manager of the Logan Iron & Steel Co.'s plant at Burnham, Pa. Mr. Phillips is well known in the Pittsburgh district.

G. M. Schidle, formerly identified with E. W. Mudge & Co., Pittsburgh, has been appointed representative at the Pittsburgh offices of La Belle Iron Works, Steubenville, O. The new offices have been opened on the 23rd floor of the Oliver building.

John P. Collins, who is succeeding Captain James Scott, of the Lucy furnace plant of the Carnegie Steel Co., at Pittsburgh, will hold the title of city manager of the company's furnaces. He will supervise the Lucy, Isabella, Edith and Neville furnaces.

J. C. Wicks, president of the Garry Iron Co., Niles, O., acted as toastmaster at a banquet given by the directors, superintendents and office force of the Brier Hill Steel Co., Youngstown, O., recently. The Garry Iron Co. is a subsidiary of the Brier Hill Steel Co.

Charles P. Hull, former secretary of the Vulcan Detinning Co., Jersey City, N. J., has been named treasurer, succeeding Adolph Kern, resigned. Mr. Kern was also vice president, but that position has not been filled. Lester J. Saul has been appointed secretary.

John L. Swan, who lately has become associated with the Oil Power Engineering Corporation, New York, was formerly with the Chicago Pneumatic Tool Co., New York, as manager of the New York office and later as mechanical engineer in the compressor department.

Harry Dreeland has been appointed assistant superintendent of the Mahoning Valley works of the Republic Iron & Steel Co., Youngstown, O., filling a vacancy left by the promotion of L. H. Mullin to the superintendency. John Cunningham was promoted to the night superintendency.

James G. Mustin has been made supervisor of the educational work being conducted by the American Steel & Wire Co., at Cleveland, for the benefit of the salesmen of the company. For many years, Mr. Mustin has been general superintendent of the Rankin, Pa., plant of the company.

James L. O'Neill has been appointed credit manager of the Carnegie Steel Co., to succeed Herbert P. Howell, former assistant to the first vice president, who has become identified with the Bank of Commerce, New York City. Mr. O'Neill has been with the Carnegie company 15 or 16 years, starting out as an office boy and working his way through the various departments.

James H. Johnston, 6094 Jenkins arcade, Pittsburgh, has taken over the Pittsburgh agency of the Lagonda Mfg. Co., Springfield, O., maker of tube cleaners and boiler room specialties. Mr. Johnston now has the exclusive right for handling all of the company's products in the Pittsburgh territory. For the last seven years, he has been manager of the company's office at Pittsburgh.

G. W. Hewitt, a graduate of the University of Wisconsin, Madison, Wis., has been appointed manager of the blast furnace department of the Riverside works of the National Tube Co., at Benwood, W. Va., to succeed Clarence Underwood, who is now identified with the Gary, Ind., plant of the United States Steel Corporation. Mr. Underwood was presented a gold watch by employes when he left for Gary.

L. R. Rankin, superintendent of the Carnegie Steel Co., plant at Farrell, Pa., was recently presented a gold watch chain and Masonic charm by employes of the electrical department of the plant. J. Kagarise, superintendent of the open-hearth department of the works was presented a valuable gold watch in appreciation of the good work he has done since he has been with the company. Mr. Kagarise has been promoted to take charge of the plant at Braddock, Pa.

Judge E. H. Gary, of the United States Steel Corporation, and James J. Hill, formerly active head of the Great Northern railroad, have been invited by the directors of the board of commerce, Detroit, Mich., to be guests of the organization at a luncheon, the date of which will be set to suit the convenience of the invited guests. It is expected that Messrs. Gary and Hill will speak with reference to the proposed steel plant at Sandwich, Ont.

R. M. Bassett has assumed the management of the Chicago office of the Murphy Iron Works, manufacturer of the Murphy automatic smokeless furnace, Detroit, Mich. He was formerly in charge of the company's Cincinnati office. James H. McCabe, formerly connected with the engineering department of the company, has taken charge of the Cincinnati office. The latter office, which was badly damaged by the Gibson House fire, has been repaired and is being occupied.

Harry W. Bolens, president of the Gilson Mfg. Co., Port Washington, Wis., and president of the Wisconsin Manufacturers' Association, has been elected official representative of that organization on the advisory council of the Chambers of Commerce of the United States. Adam Hirshheimer, president of the La Crosse Plow Co. and other machinery interests at La Crosse, Wis., is one of the delegates of the association to the annual convention of the chamber at Washington, on Jan. 21.

W. E. Hartman, who until recently was managing engineer for the H. Koppers Co., Chicago, and is now consulting engineer with offices at 711 Fort Dearborn building, that city, has been retained as consulting engineer by the Republic Iron & Steel Co., Youngstown, O., in connection with the construction of the 68 Koppers by-product coke ovens at the company's plant. Mr. Hartman also has been retained by the Gas Machinery Co., Cleveland, to take care of its coke oven department.

George M. Wright, president of the Wright Wire Co., Worcester and Palmer, Mass., has been inaugurated mayor of Worcester. One of the features of the inauguration ceremonies was the presentation to Mr. Wright of a silver loving cup mounted on an ebony base, by the 700 employes of the company of which he is head. Each employe contributed 10 cents toward the purchase of the cup. The development of a "city beautiful" comprised the keynote of Mayor Wright's inaugural address.

G. J. Harding has been elected president of the Giant Mfg. Co.,

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Council Bluffs, Ia., maker of weaving looms and the Giant pipe pusher, a machine for pushing pipe through the ground instead of trenching. Other officers elected at the recent annual meeting were O. M. Hall, vice president; H. G. Baker, secretary and manager; Clyde Harding, treasurer. Directors chosen were C. Hafer, Benjamin McInnerney, W. P. Hughes, G. J. Harding, O. M. Hall, H. G. Baker and Clyde Harding. The officers and directors were re-elected with the exception of Clyde Harding.

J. G. White has been elected chairman of the finance committee of the J. G. White Engineering Co., New York. Other officers chosen are: Gano Dunn, president; E. G. Williams, A. S. Crane, H. A. Lardner, vice presidents; H. S. Collette, secretary; R. B. Marchant, treasurer. The following have been elected to the board of directors: Harry Bronner, James Brown, F. Q. Brown, Douglas Campbell, George C. Clark Jr., Bayard Dominick Jr., A. G. Hodenpyl, T. W. Lamont, Capt. Marion McMillin, J. H. Pardee, E. N. Potter, Frederic H. Reed, Charles H. Sabin, Frederic Strauss, Moses Taylor, Geo. H. Walbridge, E. N. Chilson and C. E. Bailey.

Russell Dale, until a few days ago western representative for the Carpenter Steel Co., Reading, Pa., has accepted the position of manager of sales for the Rich Tool Co., with offices at 410 Railway Exchange building, Chicago. The Rich Tool Co. has a large plant for the manufacture of high-speed drills, reamers and other metal-working tools, at Chicago, and intends to make extensive additions in the near future. For many years past, Joseph T. Ryerson & Son have been the exclusive selling agents for this company, but under the new arrangement, a sales organization will be built up by Mr. Dale so that the company will market its tools direct to the trade.

Louis H. Bill, San Francisco, for many years in charge of the Pacific coast business of the Thomas B. Jeffery Co., Kenosha, Wis., motor car manufacturer, has been appointed assistant general manager of the company. Harry E. Field, New York, who has been eastern manager for several years, has been appointed general sales manager with George H. Cox as assistant. George M. Barry has been promoted to second vice president and treasurer and Edward S. Jordan, for eight years advertising and sales manager, has been elected secretary of the corporation. Edward S. Maddock has been made assistant secretary. Charles T. Jeffery is president and general manager and Harold W. Jeffery is vice president of the company.

W. C. Bird, of the Farrell, Pa., plant of the American Steel & Wire Co., has been transferred to the plant at Waukegan, Ill., and has been succeeded by C. M. Diehl, former chief clerk of the Rankin, Pa., plant. Other changes that have been made are as follows: James G. Mustin, superintendent of the Rankin, Pa., plant, has been transferred to the sales department and H. S. White, superintendent of the Braddock plant, has been appointed Mr. Mustin's successor. Mr. White is succeeded by E. H. Boden, former assistant superintendent of the Rankin plant, William Murphy, master mechanic at the Braddock wire mill, has been transferred to the Rankin plant. James Fieldhouse, master mechanic at the Rankin works, has been appointed master mechanic at the Braddock plant.

H. A. Waterman, superintendent of the Milwaukee, Wis., works of the International Harvester Co., has been placed in charge of important work directed by the main office of the company and which will take him over the greater part of America and Europe. He will continue to reside in Milwaukee. Burton C. Wait, assistant superintendent of production, succeeds Mr. Waterman and his assistant is R. H. Robinson, who is promoted from the position of mechanical engineer. L. B. Sperry, chief draftsman, is promoted to chief of the experimental department. Under Mr. Waterman the departments were operated as a unit. Mr. Waterman went to Milwaukee from the McCormick works at Chicago seven years ago. The works at the Wisconsin city then employed 900 men. On Jan. 1, 1913 the pay-roll showed over 5,000 workmen.

S. B. Grace, superintendent at the plant of the Central District & Printing Telegraph Co., Pittsburgh, has been transferred to Philadelphia, by the Bell Telephone interests, where he will act as engineer of outside plants for the Bell and affiliated companies. Mr. Grace recently was elected president of the Engineers' Society of Western Pennsylvania. His change in location will necessitate the election of a successor. Mr. Grace established a wide reputation through his numerous improvements in telephony. He is a graduate of the University of Michigan and recently received a master's degree from that institution. B. Stryker, former plant superintendent of the Bell company of Pennsylvania, has been appointed Mr. Grace's successor as superintendent of the Pittsburgh plant. Mr. Stryker has been connected with telephone companies for about 25 years.

Edward P. Hettiger, formerly with the Chicago office of Hickman, Williams & Co., will take charge of the Cincinnati office as manager, assisting Frank M. Eaton. Howard Black, Mr. Eaton's former assistant, will be in charge of the coke department, which has been recently established in connection with the agency of the Coal Products Co.'s plant at Joliet, Ill. Richard Nicholas will replace Mr. Hettiger in assisting H. L. Williams in the management of the Chicago office. Day Williams, formerly with the St. Louis office, has taken charge at Birmingham, Ala., replacing L. E. Patton, resigned. Mr. Williams is succeeded at St. Louis by Charles M. Day, who has been employed at that office. It is announced that these changes constitute the first movement in incorporating the business of Hickman, Williams & Co., which will be announced when it is an accomplished fact. This may bring about other minor changes in the organization, which will also be announced as they occur. It is understood that Mr. Eaton, who has been in charge of the Cincinnati office, will devote his time largely to supervising the organization in general. Mr. Eaton's health is much improved and he will probably be able to be more active than in the past. Mr. Hettiger's business acquaintances and business associates in Chicago unanimously express regret at seeing him leave the city, but unite to congratulate on the deserved promotion.

ATTORNEYS ARGUE

For Lower Freight Rates in the South.

Before the Interstate Commerce Commission at Washington, in the case of the Sloss-Sheffield Steel & Iron Co., et al., against the Louisville & Nashville Railroad Co., et al., a document comprising a statement, brief and argument has been filed in behalf of the complainants, by Wimbish & Ellis, attorneys. The general propositions laid down are that the rates complained of are unjust and unreasonable in view of the cost and value of the service and that the rates produce unjust discrimination on southern iron, both as between commodities and in favor of other iron producing districts. The history of the iron industry in the south and railroad rates is given. On Feb. 1, 1904, the rate from Birmingham to Cincinnati was $2.75. This rate was increased on March 1, 1906, to $3 a ton, and on April 1, 1907, to $3.25. At the time of the last advance, and for two months preceding, iron was selling in Cincinnati at $26 a ton, the highest price reached since the year 1880. Mr. Bowron's testimony is quoted as stating that since the panic of 1907, the furnace companies have borne "the extreme misery of paying rates fixed on a high price of iron after the price had dropped to a low point."

The attorneys argue that iron is entitled to the freest distribution that can be attained under the lowest rates consistent with a fair return to the carrier. It is asserted that pig iron is essentially a raw material and that its tremendous potentialities are developed only by the processes of further manufacture. The producer in Alabama is entitled to the benefit of his natural advantage. The public interest demands that those who employ the use of iron in the manufacture of their products shall obtain this raw material at the lowest cost at which it can be transported from the source of cheapest supply.

Statistics are given to show that the transportation charges operate to restrain the movement of southern iron into northern and eastern territories. It is asserted that the rates are excessive compared with those formerly in effect and that they are unreasonable in view of the cost and character of the service, and are discriminatory compared with other traffic. It is further held that the increased cost of railroad operation has been compensated for by the increase in operating efficiency, and in earnings of the carriers, and that the reduction asked for would work no injury to northern producers of pig iron.

The following colloquy between J. H. Frantz, vice president of the Columbus Iron & Steel Co., and Attorney Wimbish is quoted:

Mr. Wimbish: "In other words, you are bringing to the attention of the commission the fact that a change in any rates from an important source of supply of any commodity to important consuming markets may to an extent, and probably will to an extent, affect the relative adjustment as to every producing district entering or desiring to enter the same consuming territory. That is your general proposition?"

Mr. Frantz: "I think you stated it just as clearly as I could myself."

The complainants ask for the restoration of the rates in effect from May 1, 1897, to Feb. 6, 1899, from southern producing points to the Ohio river and beyond, which represents a reduction of $1 a ton in the present rates. This would make the rates from Birmingham to Cincinnati, Evansville, and Cairo $2.25; to Louisville, $2.00; to St. Louis, $2.75; to Chicago, $3.35, and to other points in C. F. A. territory and in the Buffalo-Pittsburgh zone the same as they were in 1897 to 1899.

Will Not Change Mining Methods

THE IRON TRADE REVIEW is officially advised by Charles Trezona, general superintendent of the Oliver Iron Mining Co., Ely, Minn., that no changes in mining methods on the Vermillion range are contemplated at this time. A report has been circulated stating that the Oliver Iron Mining Co. would make extensive changes in its mining methods.

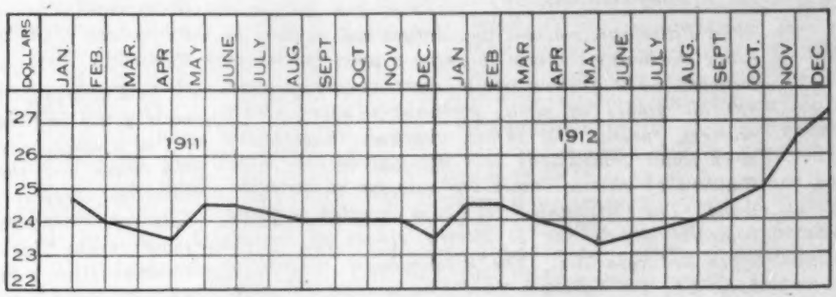
The Fannie furnace of the United Iron & Steel Co., at West Middlesex, Pa., went in on Bessemer early last week, after an idleness of three years.

SUBSTANTIAL ADVANCE

Shown by Cast Iron Pipe Prices at New York in 1912.

Prices of cast iron pipe delivered at New York showed the substantial gain of almost $3 a ton during the year 1912, according to a compilation of monthly averages based upon actual sales which has been made by Daniel Runkle, of the Warren Foundry & Machine Co., 111 Broadway, New York. This comparison of prices is based upon the standard of 6-inch pipe of 30 pounds per foot weight, delivered f. o. b. New York, per net ton of 2,000 pounds.

The figures represent the monthly averages of actual sales made by the Warren company, but they are somewhat higher than the quotable monthly market in the metropolis since severe competition by certain eastern makers brought out very low prices at certain periods in the year.



PRICES OF CAST IRON PIPE, NEW YORK, FOR TWO YEARS

The averages of the Warren Foundry & Machine Co. show, however, the general course of the year's market, which as a whole has been quite satisfactory to eastern makers as well as to the shops in all sections of the country. These averages show that the low point of the market was reached in May, which, in fact, was a lower level than had been touched in the previous year of rather indifferent activity in the cast iron pipe trade. From May on, the market steadily advanced and the highest price was established in December.

A comparison of monthly prices at New York for the years of 1912 and 1911, according to Mr. Runkle's figures, is as follows:

	1912.	1911.
January	$24.50	$24.75
February	24.50	24.00
March	24.00	23.75
April	23.75	23.50
May	23.25	24.50
June	23.50	24.50
July	23.75	24.25
August	24.00	24.00
September	24.50	24.00
October	25.00	24.00
November	26.50	24.00
December	27.25	23.50

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, a satisfactory total of new inquiries for machinery has appeared in the trade during the past week. Dealers now have bids out on a large aggregate of business, on a large part of which they expect definite action, which will be announced within the next two or three weeks. This condition is conspicuously true of machine tool and general shop supply dealers. The most important single addition made to the prospective business in those lines is that of the Lehigh Valley railroad, calling for about twenty machines. Intimation has been given bidders on the New York Central's inquiry for tools, amounting to about $35,000, that early action will be taken on that list. Bids have gone in on the Boston & Maine list, which will probably be bought against next month. General railroad buying is regarded as a likely development during the first three or four months of the year. Included are requirements of the Baltimore & Ohio, the Western Maryland, the Pennsylvania, and the Reading railroads.

In Pittsburgh, machine tool dealers and builders of heavy machinery continue to enjoy a good volume of business. The former advise there is fair demand for all grades of tools, particularly lathes, drills, reamers, punches and shears, although no especially large single transactions have been closed this week. Builders of electric cranes are enjoying a heavy demand. The Pittsburgh Steel Co. is expected to award contracts shortly for 23 electric cranes of various types and capacities. The Westinghouse Electric & Mfg. Co., the Carnegie Steel Co., and several other interests, recently have closed negotiations for cranes. Makers of rolling mill machinery are operating plants at full capacity, and a couple of interesting inquiries are pending.

In Chicago, the past week has resulted in no development discouraging to machinery trade and the outlook continues to be good. Stock has been depleted greatly and it is reported from some quarters that a very active market would result in trouble with deliveries. Practically all of the railroad requirements have been contracted for, and a large portion of industrial lists in this territory also has been closed. Some of the latter are still pending, however, and it is understood that the Santa Fe will require additional tools, but no bids have been asked for as yet. It is understood that the Buda Co. has inquiries out for several large tools, some of which have been placed. While plans for new construction have been reported during the week, nothing definite concerning them can be stated as yet.

In Cleveland, machine tool dealers are taking an optimistic view of trade conditions and are looking forward to an early resumption of the heavy buying of last fall and a satisfactory total of business for the year. This belief is based partially upon the larger volume of orders closed during the past week and partially upon the prospective business expected to appear shortly. The appearance of a list calling for 60 machine tools, valued at approximately $35,000, is reported. The list is said to have been sent out by a southern Ohio company, but was not widely distributed.

In Cincinnati, the machinery market is becoming more active and manufacturers in that city are hopeful of a much better year in 1913. Railroads are buying better now than they have for some time, and there are several large lists pending. Several new lists are expected soon, among which will be those of the Erie and Baltimore & Ohio railroads. Conditions are a little hampered at present over tariff revision, which may call for the removal of tariff on foreign-made machine tools, as was provided in the Underwood bill at the last session. The action of congress is very important to a great many of the machine tool manufacturers, and they have therefore contered all of their interest upon Washington during the hearings of their delegates, who were sent to that city last week. Lathes and radial drills are about equally divided as to demand, and more orders are being taken for these tools at the present time than for any others.

New Construction

The plant of the Temple Malleable Iron Co., Temple, Pa., is to be remodeled and enlarged.

A $40,000 addition to its factory will be made by the Canada Steel Goods Co., Hamilton, Ont.

A structural steel plant to cost $25,000 is planned for the Dennis Wire & Iron Works Co., Ltd., London, Ont.

The Burpee-Letson Co., Bellingham, Wash., is having plans prepared for an addition to its foundry.

The Dominion Atlantic Railway will next year remove its car business from Kentville, N. S., to Middleton, N. S., the new construction at Middleton to cost $100,000.

The American Sugar Refining Co. has let a contract for a refinery to be erected in Jersey City, N. J.

Morgan & Wright, Detroit, will erect a machine shop, 174 x 257 feet, three stories.

The Auburn Automobile Co., Auburn, Ind., will erect a factory 60 x 80 feet, two stories.

The Majestic Furnace Co., Huntington, Ind., will erect an addition to its foundry, 50 x 100 feet, one story.

Armstrong Machinery Co., Spokane, Wash., has prepared plans for the erection of a new foundry for making semi-steel castings.

The Old Colony Foundry Co., East Bridgewater, Mass., has made plans to erect a foundry, 30 x 50 feet, one story.

The National Cash Register Co., Dayton, contemplates additions to its Toronto, Ont., plant, which probably will include the erection of a brass foundry.

The city of Lexington, Ky., is considering the erection of a plant for the disposal of garbage. Address Mayor Cassidy or the department of public works.

The plant of the Lawrence, Mass.,

Boiler Works, which was destroyed by fire Christmas morning, is to be rebuilt at an estimated cost of $10,000.

The Beaver Automobile Co., Portland, Ore., recently incorporated with a capital of $150,000, will erect a plant at Vancouver to manufacture automobiles.

The Scranton Electric Co., Scranton, Pa., has received a permit to build an extension to its boiler plant. The building will be 120 x 120 feet, three stories, of steel and concrete throughout.

President John Meyer, of the Port Washington Brass Works, Port Washington, Wis., advises that the plant, recently damaged seriously by fire, will be rebuilt in the spring. New equipment may be needed.

G. Stegmayer, architect, 168 East Ninety-first street, New York, has filed plans for a four-story wagon factory on Fifty-sixth street, near Eleventh avenue. The building is estimated to cost $45,000.

The Devore-McGormely Co., Toledo, has been awarded the engineering contract in connection with the erection of an addition to the Herr Engine Co., at Portsmouth, O. The building will be 80 x 100 feet.

The Putnam Foundry & Machine Co., Norwich, Conn., has made plans for new buildings which will treble its floor space and quadruple its output, which will be 5,000 boilers annually.

The Henderson Mining & Mfg. Co., Henderson, Ky., has authorized the construction of a cold storage plant to cost in the neighborhood of $10,000. Address J. T. Wilson, president.

The Munfordville Electric Light & Power Co., Munfordville, Ky., recently incorporated, will let a contract for the construction of a plant at once. C. C. Winston or J. C. Adams can give details.

The Louisville & Nashville Railroad Co., with general offices in Louisville, Ky., is preparing to spend $200,000 in the construction of new shops at Howell, Ind., near Evansville.

It has been announced that the recently-incorporated Niagara Falls Furnace Co. will erect a plant consisting of two manufacturing buildings on property acquired a short time ago in the northern section of Niagara Falls, N. Y.

At Ottawa, Can., Aluminum Castings, Ltd., is building a foundry, 50 x 150 feet, which will be devoted to the manufacture of brass, bronze and aluminum castings. A battery of eight brass and aluminum melting furnaces is being installed.

The Continental Computing Cash Register Co., Spokane, Wash., will enlarge and improve its plant for the purpose of manufacturing change making machines, cash registers and adding machines, at a cost of about $150,000.

A. M. Byers & Co., Pittsburgh, has placed a contract with the Pittsburgh Bridge & Iron Co., to fabricate steel for its new galvanizing department at its South Side works. Several improvements are being made to the plant.

The Nail City Smelting Works, Wheeling, W. Va., will be extended by the erection of a 30 x 160-foot, two-story, brick building, which will contain the company's offices, pattern storage and stock room. H. Waterhouse is proprietor of this plant.

The H. A. Steiner Mfg. Co., Chilton, Wis., manufacturing gasoline engines, has increased its capital stock from $15,000 to $80,000 preparatory to starting work on a new group of factory buildings at Chilton. Definite plans are now being completed.

The Wellston Steel & Iron Co., Wellston, O., is rebuilding its furnace stack and hoist house, and contemplating the installation of two stoves in the near future. The two Wellston furnaces of this company are in blast, but its Milton furnace is idle.

The Ideal Supplies Co., Ludlow, Ky., recently incorporated with $60,000 capital stock, will build an ice factory and establish a plant for handling sand, requiring conveyors and other equipment for the latter. J. J. Weaver is president of the company.

The Kline-Macy Foundry & Machine Co., Noblesville, Ind., is planning to erect a foundry and machine shop. Those interested in the company are: Charles B. Macy, E. V. Brigham, Cassius C. Curtis, Harry L. Craig, Louis N. Joseph, George C. Kline and John C. Jones.

The Watson-Stillman Co., 50 Church street, New York, is asking bids on the construction of a machine shop to be erected at Aldine, N. J. The building is to be two stories high, 120 x 100 feet, and is estimated to cost $50,000. F. A. Waldron, 37 Wall street, New York, is the engineer in charge.

The State hospital, Middleton, N. Y., has awarded the contract for the construction of a new power house and coal pocket, the building to be of brick, concrete and steel. Construction work will start in the spring. H. R. Van Valkenburgh is contractor.

The Atlantic Foundry Co., Cleveland, has had plans drawn for a new factory, 100 x 200 feet, one-story, steel and reinforced concrete, to be erected at 7045 Morgan avenue. The building will have a concrete floor, and will be fitted up for electric lights and steam heat.

Joseph & Joseph, Louisville, Ky., have completed plans and specifications for the National Theater, to be erected at Fifth and Walnut streets, in that city. Bids will be received shortly, though the closing date has not been fixed. Reinforced concrete will be used principally.

At a recent meeting in New York, final arrangements were made by the financial interests back of the East Liverpool Traction & Light Co., and the Ohio Valley Scenic Route Railway Co., for the spending of $2,000,000 in the construction of a large power plant on Beaver creek, near Smith's Ferry, Pa., at the Island Run mines.

The N. B. Gaston's Sons Scale Co., Beloit, Wis., is preparing for the enlargement of its foundry facilities, but it has not yet been decided whether to build an addition to the present foundry or erect an entirely new and modern building. In either case it is planned to commence construction work by Feb. 15, as the need of better facilities is imperative.

John Meyer, of Port Washington, Wis., whose brass works, known as the Port Washington Brass Works, were destroyed by fire last week, has decided to rebuild as soon as the frost leaves the ground in the spring. He intends to make an investment of about $4,500. The loss on the old plant was $3,000, partly covered by insurance.

The International Harvester Co. is preparing to erect a building 70 x 200 feet, six stories in Akron, O., at an approximate cost of $300,000, to replace that part of its factory recently destroyed by fire. The new structure will be located across the street from the former site in order that the work on the building need not be delayed by the cleaning out of the debris.

Plans for the erection of 200 rectangular coke ovens of the pusher type are being made by the W. G. Wilkins Co., consulting engineer, Westinghouse building, Pittsburgh, for the Sykesville Coke Co., Sykesville, Pa. This company is a subsidiary of the Cascade Coal & Coke Co., and will be operated by the management of that organization. The new ovens will parallel those of the

Cascade company. Additional equipment will be required.

The Eastern Car Co., of New Glasgow, N. S., expects to commence business at its new works below those of the Nova Scotia Steel & Coal Co., in July. The power house and offices have been erected and roofed in, the foundations are all in place for the main building, which is 1,100 feet long by 300 feet in depth, and the steel frame work for this structure is now being put in place.

Chatterton & Warwick, 108 South Eighth street, Brooklyn, N. Y., have taken a contract to erect ten buildings at Front, Pollock and Webster streets, that city, for John C. Wiarda & Co., manufacturer of chemicals. The plant will include a shop 50 x 100 feet; foundry 50 x 100 feet; acid works 50 x 100 feet; combustion shop 50 x 39 feet, and three storage buildings, 50 x 100 feet.

The Parish & Bingham Co., Cleveland, manufacturer of sheet metal stampings, which recently purchased between eight and nine acres of land on Madison avenue N. W., is contemplating the erection of two buildings, 700 x 100 feet each, some time this year, in order to secure more room to take care of a rapidly increasing business. This company started business with the manufacture of watches 18 years ago, later turning to bicycle sprockets, and still later to auto frames and running boards. James Scott, of Pittsburgh, is president, and William Cairns, of Cleveland, vice president and general manager.

The Continental Can Co. is erecting at Bayview Junction, Md., a building, 114 x 482 feet. The present plant produced last year approximately 160,000,000 standard packing cans and employed 700 hands. The output will be more than doubled when the new structure is put in operation. The Continental Can Co. will take over the business of the present Continental Co., a New Jersey corporation; the Export & Domestic Can Co., a New York corporation, and the Standard Tin Plate Co., and will have a capitalization of $7,500,000 7 per cent bonds cumulative preferred and $10,000,000 common stock. The companies operate plants at New York City, Syracuse, Cannonsburg, Pa., Chicago and Baltimore.

The Brennan - Smyth Steel Co., Cleveland, manufacturer of crucible steel castings, has been incorporated as the Brennan-Smyth Steel Castings Co., with a capitalization of $200,000, in order to meet increasing business in crucible steel castings and to provide for the enlarged facilities necessary for the production of open-hearth steel castings. This company has under construction at the present time a foundry addition 50 x 250 feet, one-story, of brick and concrete construction, along with a number of smaller buildings. The new foundry will be modern in every particular and the company will be in the market soon for one or two cranes of 5 or 7-ton capacity, two steel converters, equipment for a complete air system, sand blast, annealing furnaces, drying ovens and steel flasks. The success of this company has been marked, as it was established as a partnership only last April. The incorporators of the reorganized company are: Thos. M. Brennan, Malcolm M. Smyth and Louis J. Lee, all of Cleveland.

Machine Tools

Fred Kuethe and Gustav Keil, of Marshfield, Wis., have established a co-partnership and opened a general machine shop at Marshfield.

The Brown Hoisting Machinery Co., Cleveland, purchased some planing machines last week. This company has been purchasing a number of machine tools from time to time.

The Newton Machine Tool Works, Philadelphia, will continue from time to time to install a number of modern machine tools to replace older types. H. W. Champion is president of the company.

A series of consular reports on the markets for American-made machine tools in Latin America will be issued in the near future by the Bureau of Foreign and Domestic Commerce. Lists of firms and individuals that sell and use machine tools in the various countries are a valuable feature, and considerable attention is given the sales methods, credit terms, etc. The Latin American countries are largely agricultural and the demand for machine tools has consequently been limited, but there is an increasing use of machinery of this sort in some localities in Latin America, especially in connection with railroad repair shops.

Water Works

The Princeton, Ind., Water Co. is considering enlarging its plant, the municipal authorities having recommended extensive improvements for fire protection purposes.

The Phoenix Mfg. Co., of Eau Claire, Wis., has been awarded the contract to construct and install a large sized Laursen automatic water pumping outfit for the Dells Paper & Pulp Co., of Eau Claire, as an addition to the two smaller pumps installed some months ago. The Laursen Automatic Pump Co., owner of the patent rights on the pump, is having its machines built by the Phoenix people until established in its own plant.

Vancouver, B. C., has awarded contracts for 6,600 feet of 8-inch steel pipe and 5,280 feet of 12-inch pipe, but is still to give a contract for the supply of 26,400 feet of 6-inch steel pipe. The total cost is $43,818.

Power Plant Equipment

Cogar & Co., Midway, Ky., is planning to build a mill for the manufacture of a stock food and will be in the market soon for power, milling and conveying equipment.

The Seelbach Hotel Co., Louisville, Ky., will construct a new power house at a cost of $50,000 as soon as a city ordinance authorizing the closing of an alley is passed.

The Smith & Scott Tobacco Co., Paducah, Ky., will spend $50,000 in the construction of an addition to its factory. Power and special machinery will be needed.

The city of Paducah, Ky., is preparing to purchase a new dynamo and other equipment for the municipal lighting plant, an appropriation of $16,500 having been recommended. Address the board of public works.

A steam heating plant will be needed for a new high school building to be erected at Hartford, Ky., a contract for the construction work having been let. Address the board of trustees.

The Tennessee Eastern Electric Co., Greeneville, Tenn., is completing the construction of a dam across Nolachuckey river, and will soon install the necessary equipment. It may also build an electric railway system.

The Harrisburg Foundry & Machine Works, represented by H. W. Reisinger, Park building, Pittsburgh, recently took the following orders for steam engines: One 150-kilowatt and one 100-kilowatt steam engine to be installed in the Cincinnati, O., post office; three 100-kilowatt unit steam engines to be installed in the Pittsburgh post office; two 75-kilowatt and one 35-kilowatt steam engine for the Louisville Y. M. C. A., Louisville, Ky.; four 300-kilowatt engines for the Rail & River Coal Co.; two 50-kilowatt steam engines for the Stanley Mineral Springs Co., Manitoba, Can.; two 150-kilowatt and one 100-kilowatt steam engine for the Second National Bank building, Toledo, O.; and two 85-horsepower Nash gas en-

gines for the S. R. & G. A. Kelly Jr. Co., Pittsburgh.

Among recent orders received by the Westinghouse Electric & Mfg. Co., are the following: St. Petersburg Investment Co., St. Petersburg, Fla., five double equipments of No. 306 motors and K-36-J control; Santa Barbara Consolidated Railway Co., Santa Barbara, Cal., 10 double equipments of No. 337-C-3 motors, and HLF control; Brunswick & Yarmouth Street Railway Co., Portland, Me., three double equipments of No. 101-B-2 motors and double end K-28-B control; Long Island Railroad Co., New York City, 27 equipments of No. 308 motors and type AB control; The Oakland, Antioch & Eastern Railway Co., San Francisco, one quadruple equipment of the No. 308-B-6 motors and type HL control, for use on an electric locomotive; The Davenport & Muscatine Railway Co., Davenport, Ia., eight Westinghouse double equipments consisting of No. 323-A motors and double end K-36-J control; The Cumberland County Power & Light Co., Portland, Me., one quadruple equipment of No. 101-B-2 motors and double end K-28-B control.

New Buyers

The Corliss Gas Engine Co., San Francisco, Cal., is building an addition to its plant at Petaluma, Cal. Additional equipment will be required.

The Sprague Engineering Co. has been organized at Milwaukee by C. A. Sprague, Frank Szolkowski and B. Beebee. The capital stock is $4,000.

Rogers, Brown & Co. has purchased a large hoisting bridge from the Brown Hoisting Machinery Co., Cleveland, to be installed at Buffalo.

The Stock Process Steel Co., Detroit, has been incorporated with a capitalization of $300,000. The principal stockholders are Allen Mosher and A. C. Taylor.

The Ohio Valley Electric Co., Ashland, Ky., has plans for the enlargement of its system by the extension of a line to Russell, Ky. Manager W. W. Magoon is in charge.

The official court of McCracken county, Paducah, Ky., has authorized the purchase of two road graders and a concrete mixer. Address the road supervisor.

The Moran Flexible Steam Joint Co., Louisville, Ky., is in the market for a second-hand boring machine. Address E. B. Jenkins, superintendent.

R. E. Runkle, of Runkle & Co., Bellingham, Wash., has purchased the plant of the Bellingham Foundry, and will expend about $100,000 in improvements and additions.

The Doxameter Co., Chicago, has been incorporated with a capital stock of $25,000, and will manufacture gasoline saving devices for engines. The incorporators are W. J. Doxey, John A. Doxey and George H. Flanagan.

The Smith Drill & Machinery Co., Chattanooga, Tenn., has been incorporated with a capital stock of $50,000. The incorporators are G. W. Smith, S. M. Thompson and Bryan Goger.

The Staybestos Mfg. Co., Philadelphia, recently incorporated with a capital stock of $10,000, to manufacture a complete line of S M-C friction facings, advises that it expects to enlarge its plant and will be in need of more machinery.

The Globe Machinery Co., Indianapolis, Ind., has been incorporated with a capital of $10,000, to manufacture a line of machinery. The directors and principal stockholders are: William S. and Ethel L. Bunnell, Willis Garwood and Bert Garwood.

The S. B. Alberman Co., New Haven, Conn., has been incorporated with a capital of $10,000, to deal in scrap metal and also to refine and smelt metals. The incorporators are: Samuel B. Alberman, Eva Alberman and Samuel Alberman.

The Westover Boat Co. has been organized at Madison, Wis., and incorporated for $5,000 to build steel and wood boats, marine engines and machinery, motor boats, etc. The incorporators are Carlos S. Westover, S. H. Chase and Ray C. Tuttle.

The Standard School Heater Co., Chicago, has been incorporated with a capital stock of $10,000 to manufacture furnaces and heating and ventilating apparatus. The incorporators are Schuyler C. Wilson, James K. Shearer, James E. Sellers and M. Jesse Bowman.

The P. A. R. Airboat Co. has been organized at Milwaukee, Wis., and incorporated with a capital stock of $10,000, to establish a plant for the production of aeroplanes and other air craft, as well as motors and parts. The promoters are Forest E. Post, Will J. Morgan and William Ruehl.

The Joliette Steel Casting Works, Joliette, Que., has been incorporated at Ottawa, the incorporators being George A. Delisle, manufacturer; John Lawrence McDonald, contractor; A. Carle, accountant; and John B. Ducols, all of Joliette. The company will carry on a steel casting business.

Marion Light & Heating Co., Marion, Ind., merger of the Marion Light & Heating Co., Jonesboro Lighting Co. and Upland Electric Co.; capital, $1,600,000; principal offices to be in Marion; directors, H. L. Finley, Frank P. Hunter, of Brooklyn, N. Y.; M. B. Smythe, A. H. Melton, William J. Jeffers, of New York City, and F. W. Drager, of Elizabeth, N. J.

The Hermes Motor Co., Cincinnati, has been incorporated with a capital stock of $30,000, to manufacture automobiles. The incorporators are, Albert Kleybolte, Powell Crosley Jr., Chas. Eissen and others. The company is now looking for a factory site, and will begin operations as soon as one is secured.

Large extensions are to be made by the Grand Trunk Pacific to its shops at Rivers, Man., which is headquarters for the repair work of both eastern and western divisions of the railroad. The extensions will involve the expenditure of thousands of dollars and the purchase of a large quantity of new machinery.

The Grand Trunk Pacific railroad has called for tenders for machine tools, motors, furnaces, cranes, etc., for the equipment of its car shops at Transcona, Man. Specifications and forms of tenders may be obtained in the office of W. J. Press, mechanical engineer, Ottawa, Ont. All tenders must be in by Feb. 13.

L. R. Veatch & Co., Louisville, Ky., has filed articles of incorporation, the capital stock being $20,000. The concern will continue the business which has been conducted by L. R. Veatch personally, that of manufacturing and repairing flour mill machinery. The company has a shop at First and A streets and for the present will not enlarge it.

The Reinforced Bar Seat Co., Louisville, Ky., has been formed to manufacture a sheet metal device for use in reinforced concrete work. Charles A. Koerner heads the company, which has been having its product made at the plant of the Louisville Cornice & Roofing Co., and marketed by the Chicago Builders' Specialties Co.

The Killen-Walsh Mfg. Co., Appleton, Wis., has been duly incorporated under the laws of Wisconsin, the authorized capital being $100,000. The incorporators are William H. Killen, William Strait and Walter Walsh. As already reported in THE IRON TRADE REVIEW, the company has leased a plant and is now ready to begin the manufacture of gasoline tractors invented by William Strait.

The Carter Coal Corporation, Bristol, Tenn., recently organized with a capital stock of $10,000,000, will be in the market for a large amount of machinery in the near future, as it has arranged to take over a number

of mining properties in Kentucky, Tennessee and Virginia and develop them extensively. George L. Carter is president of the company and T. F. Davis secretary.

The Canadian Northern railroad has ordered railroad stock to the amount of $7,000,000 for delivery before Aug. 1. The contracts, which have been awarded to Canadian companies, include 136 locomotives, 1,850 box cars, 700 flat cars, 300 ballast cars and 76 passenger coaches. The Canadian Foundry Co., Toronto, secured an order for 25 of the locomotives.

The Spring Water Co., Ltd., Montreal, Que., has been incorporated at Ottawa with $2,000,000 capital to carry on the trades of engineer, founder, smith and mechanic as well as the business of a water company. The incorporators are Thomas Sargent Owens, Harry McIntyre, Charles George Macartney, Lawrence Edgar Oborne and Maude Robertson, all of Montreal.

Griffith & Co., Ltd., Montreal, Que., has been incorporated at Ottawa with $2,500,000 capital to carry on a contracting, developing and construction business, as well as that of electrical, civil, hydraulic and harbor engineer. This is the company which is interested in the construction at Courtney Bay, N. B., of a big iron and steel works in connection with proposed harbor improvements. The incorporators are Philip Risdale Warren, Richard Tuson Heneker, Walter Seely Johnson, Hugh Wylie and Mabel Hyndman, all of Montreal.

New Incorporations

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Berston Steel Wheel Co., Bethlehem, Pa.; $10,000; J. Worth Carnahan, E. O. Hoffman, E. H. Miller.

Wizard Motor Co., Indianapolis; $50,000; by O. C. Forbes, Edward H. Habig, P. S. Florea.

Globe Machinery Co., Indianapolis; $10,000; William S. and Ethel L. Bunnell, Willis Garwood, Bert Garwood.

Ohio Automatic Valve Co., Cleveland; $5,000; Bert E. Wollinger, David Falk, Frank Woliger, Horace Neff, S. J. Berman.

Champion Wire & Iron Works, Louisville, Ky.; $10,000; J. H. Shrader, Albert T. Kochenrath and J. Shrader.

Rieck Sheet Metal Co., Dayton, O.; $25,000; Edward A. Reick, Bernard R. Rieck, Walter Rhoden, Albert F. Hickey, Wm. W. Cottier.

N. W. Yeo Sheet Metal & Furnace Co., Cleveland; $1,000; Roy Black, S. W. Yeo, A. H. Fiebach, H. Savord, J. Bushen, J. F. Lamb.

George Automatic Roller Bearing Co., Hamilton, O.; $550,000; Walter H. Miller, Geo. T. Reins, Charles E. Heiser, Edward Ritchie, C. R. Greer.

National Welding Co., Jersey City, N. J.; $25,000; general automobile business; incorporators, Edw. P. Hoyt, S. Herbert Culver, L. W. Phillips.

Brennan-Smythe Steel Castings Co., Cleveland; $200,000; Thomas M. Brennan, Malcolm M. Smyth, Louis J. Lee, Thomas H. Jackson, Oscar J. Campbell.

American Chain Co., Inc., Manhattan, N. Y.; manufacture chains, etc.; $730,000; Walter B. Lasher, Wm. W. Wheeler, P. T. Staples, all of Bridgeport, Conn.

S. J. Johnson, Montclair, N. J.; manufacture railway supplies and appliances; $125,000; S. J. Johnson, of Montclair; J. M. Cory, of Newark; R. Stout, of New York City.

Cylinder Mfg. Co., Paterson, N. J.; manufacture cylinders, shell rolls, machinery, etc.; $20,000; Chas. F. Lynch, D. MacGregor, Theresa M. Nixon, all of Paterson, N. J.

The Holmes Tractor Co., Port Clinton, Mich.; manufacturing Holmes tractors for farm and orchard work; $50,000; George H. Holmes, George W. Sloan, R. S. Gallagher, A. R. Luchsinger.

Cossman Manufacturing Co., Newark, N. J., manufacture machinery, etc.; $100,000. Incorporators, M. C. Kirsch, Montreal, Can.; J. C. Cossman, Newark; H. Braverman, Perth Amboy.

Steele Safety Rail Fastener Co., Inc., Manhattan, N. Y.; manufacture patented articles; $30,000; Joseph A. Spratt, 160 Fifth avenue; Lawrence Mulligan, New York City; James R. Steele, Owego; Daniel R. Spratt, Poughkeepsie, N. Y.

Splitdorf Electrical Co., of New York, Newark, N. J.; to manufacture engines, motors, generators, batteries, etc.; $25,000; C. W. Curtis, 98 Warren street, Newark, N. J.; O. J. Rhode, 73 W. 92nd street, N. Y.; W. J. Murray, 214 Clinton avenue, Jersey City.

A syndicate of stockholders of the Light & Development Co., of St. Louis, has organized the Missouri Public Utilities Co. with a capital stock of $1,000,000 to operate in the state. Hugo Wurdack, president of the Light & Development Co., who probably will be the head of the new organization, says the company will own its plants throughout Missouri, having franchises in Sikeston, Charleston, Illmo and Fortfelt.

General Industrial

The Superior Metal Products Co., Elyria, O., has increased its capital stock from $15,000 to $50,000.

The Indiana Stove Works, Evansville, Ind., has increased its capital stock from $200,000 to $300,000.

The Mack Iron & Wire Works, Sandusky, O., has decreased its capital stock from $50,000 to $10,000.

The J. M. Kohler Sons Co., Sheboygan, Wis., founder, has increased its capital stock from $75,000 to $1,000,000.

The Westminster Iron Works, New Westminster, B. C., has bought property on the north side of Lulu Island, Queensboro, where it will move when the old plant is sold.

The contract has been awarded for the construction of a new coal-shipping pier at a cost of $100,000 for the Cape Breton Coal, Iron & Railway Co., Ltd., at Broughton, N. S.

The Brown Hoisting Machinery Co., Cleveland, manufacturer of hoisting, overhead transfer and ore handling machinery, is very busy filling orders in all its lines of machinery.

A company is being organized at Lawrenceburg, Ind., to manufacture a gas engine recently invented and patented by John W. Storrs, chief engineer of the Lawrenceburg Roller Mills Mfg. Co.

The plant which the Alton Steel Co. will build at Alton, Ill., will consist of two open-hearth furnaces and three mills, 8, 10 and 18-inch, respectively, to roll hoops and cotton ties. M. L. Mozier is secretary.

The co-partnership of Gano, Moore & Co. has been formed by Charles C. Gano and William H. Moore for the purpose of conducting a general coal, coke and pig iron business. The company will have offices in the Land Title building, Philadelphia.

The Beloit Iron Works, Beloit, Wis., has recently made installation of the largest paper machine ever produced at the Beloit shops, in the new $2,500,000 paper and pulp works of the Brunet Falls Mfg. Co., Cornell, Wis.

The American Steel Foundries, Chicago, has announced that its plant at Sharon, Pa., which has been idle for more than two years, will resume work within a short time. Although extensive repairs will be made, it is expected that the plant will be running within 60 days. The Sharon works were built in 1887, and include

one 30 and two 25-ton acid open-hearth furnaces, using producer gas fuel. Its annual capacity is 25,000 tons of steel castings.

The output of rolling stock from the C. P. R. Angus shops at Montreal, Que., during the last year reached the total of 17,357 vehicles of every class. This included 248 passenger cars of all kinds; 16,693 freight cars; 119 snow plows, steam shovels, etc., and 297 locomotives.

The Modern Steel Structural Co., Waukesha, Wis., has increased its capital stock from $350,000 to $550,000. The additional issue will be used for the development of the business, which has grown to enormous proportions and far beyond its present capital.

The Humble Iron Works new plant, Humble, Tex., is rapidly nearing completion. This concern is the result of the reorganization of the old Humble Machine Works, which plant was destroyed by fire, Oct. 1, 1912. The new company starts with a capitalization of $10,000.

The plant formerly operated by the International Watch Co., Jersey City, N. J., has been bought by the American Tobacco Co. The factory will be remodeled and used for the manufacture of the product of one of the subsidiary companies of the American company.

Dr. Cassoretty, a Belgian financier, has laid a plan before the Sault Ste. Marie municipal council for the construction of a dry dock and shipbuilding plant at that point at a cost of $1,500,000. If the endorsement of the council is secured, Messrs. Pethick Brothers, of London, Eng., will be awarded the contract.

The International Hoist Co., Antigo, Wis., which during last year erected an entirely new plant of more than triple the capacity of the old works now abandoned, reports an exceptionally satisfactory state of affairs. The company has orders amounting to more than $60,000 on its books, waiting to be filled.

The American Car & Foundry Co. has received contracts for the construction of six barges, 195 feet long, for use in the Panama canal, also two barges for the Pennsylvania railroad, each 250 feet long, for use in New York harbor, and two house barges for the latter company for lightering cargoes.

The Ehret Magnesia Mfg. Co., Pittsburgh, has recently taken the following contracts for Ehret's magnesia pipe covering: The Mission Pumping station, Pittsburgh; new machinery hall building at the Carnegie Institute of Technology, Pittsburgh, and the new addition to the Fort Pitt hotel, Pittsburgh.

Stove foundries at Louisville, Ky., the largest stove manufacturing center in the south, have advanced prices on their product from 5 to 7½ per cent. The increase is attributed to higher quotations on pig iron, and to heavier operating expenses. Another advance about April 1 is predicted.

The Dominion Steel Corporation has compiled figures to show that the steel shipments for last December amounted to 21,600 tons, as against 12,491 tons for December, 1911. The coal output for the month was 395,000 tons and the shipments 276,500 tons, as against an output of 325,475 tons and shipments of 249,393 tons for the corresponding month of 1911.

The annual report of the Nova Scotia Steel Co. shows that mining operations at Wabana resulted in 563,000 tons of iron ore being brought to the bank in a year, while the total shipments of steel from the New Glasgow works exceeded 75,000 tons. A total of 68,600 tons of pig iron was made, while the production of steel ingots was 80,600. All these are record figures.

The American Cross Arm Co., Pittsburgh, has taken over the old Pressed Steel Pole Co.'s works at Mt. Pleasant, Pa., which has been idle more than two years, and will commence operations in the near future. The Cross Arm company will manufacture pressed steel trolley poles and cross arms for trolley lines. W. H. Schoen is president of the Cross Arm company; John S. Wilson, treasurer, and H. D. McCutcheon, vice president.

The Optenberg Iron Works, Sheboygan, Wis., is operating at the largest capacity in its existence, due to the large number of contracts on hand. The company is now remodeling the boilers for the gas producer plant of the Milwaukee-Northern Railway Co. and constructing two large stacks for the new works of the Ross-Sellinger Glove Co., of Sheboygan, and another for the John Webber Brewing Co., at Grafton, Wis. The stacks will be 80 feet high and 3 feet in diameter.

The Moline Plow Co., Moline, Ill., has announced that it has asked the state for permission to increase its capital stock from $9,000,000 to $30,000,000 and for an extension of its charter for 99 years. This action was coincidental with the closing of the long-pending deal for the purchase of the Adriance, Platt & Co. plant, at Poughkeepsie, N. Y., which firm has been known as an independent manufacturer of farming machinery of various types. The Moline Plow Co. now possesses seven auxiliary plants.

The Louisville board of trade reports pig iron receipts at that point for 1912 of 107,104 tons, compared with 83,278 tons for 1911. Machinery receipts were 13,082,000 pounds, compared with 12,343,000 pounds in the preceding year, while shipments amounted to 23,479,000 pounds, a slight loss as compared with 1911. Iron and steel receipts were 85,000 tons, against 76,000 tons in 1911, while shipments of iron and steel were 21,000 tons, against 27,500 for 1911.

The plant of the Warner Instrument Co., Beloit, Wis., recently purchased by the Stewart & Clark Mfg. Co., of Chicago, and merged under the title of Stewart-Warner Speedometer Co., a Virginia corporation capitalized at $26,000,000, will be enlarged during the present year. Last year the plant was nearly doubled in size. It is stated that the only change to be made at Beloit is to reduce the administrative force to cover only the operation of works, as the Chicago offices will handle all executive business.

The Peru Castings & Machinery Co., Peru, Ind., purchased on Jan. 4, from the Brown Commercial Car Co., Peru, Ind., the foundry and machine shop formerly occupied by the Otis Elevator Co. It will manufacture high grade gray iron and semi-steel castings, rough machined or assembled, and will be ready for operation about April 1. The parties concerned in this transaction are C. E. McCampbell, foundry superintendent; R. M. Carter, machine shop superintendent, and J. H. Barbee, mechanical engineer, all from Milwaukee, Wis.

The Leader Engine Co., Grand Rapids, Mich., advising in regard to its increased capitalization, says it has recently taken over from the Midland Tractor Co., Detroit, its tractor business, and is preparing to manufacture the tractor in its own factory. The Leader company has always made the engines for the tractor and now expects to undertake the building of the complete machine. The company builds a line of high-grade two cylinder opposed engines for agricultural work and also suitable for stationary work or to be mounted on portable trucks.

The Grand Rapids Machine & Tool Co., and the Valley City Machine Works, both of Grand Rapids, Mich., have been consolidated under the name of the Valley City Machine Works, and the capital stock increased from $30,000 to $47,500. The

Tool company plant has been moved to the Valley City plant. Lines manufactured by the companies will be continued and new lines added. Officers are: President, Christian Gallmeyer; vice president and general manager, M. Lund, formerly president of the Tool company; secretary and treasurer, C. H. Gallmeyer.

Formal dedication of the new plant of the Allyne-Ryan Foundry Co., Aetna road, S. E., near East Ninety-third street, Cleveland, was observed a few days ago when the first ladle of hot metal was drawn from the furnace in the presence of 200 business men. The plant is 112 x 280 feet, one-story, and will manufacture auto cylinders and make a specialty of difficult castings. It was built by a company recently organized with a capital stock of $100,000. Among those present at the dedication were C. B. Bohn and E. E. Allyne, of the Allyne Brass Foundry Co.; Daniel Ryan, formerly with the Interstate Foundry Co., now president of the new company, and Rollin H. White, of the White Automobile Co.

Request has been made of shareholders of the Hydraulic Pressed Steel Co., Cleveland, to approve increase in the company's capital stock from the present $400,000, so that the capitalization will be $1,000,000 common and $200,000 7 per cent preferred. Out of the new common a stock dividend of 100 per cent is expected to be declared and $200,000 each out of common and preferred will remain in the treasury for the time being. The company, whose plant is located at 3152 East Sixty-first street and Banker avenue S. E., makes pressed steel auto frames, brake drums for autos and bicycle sprockets. The company is preparing to manufacture steel barrels entirely pressed and hooped in three operations, for use in shipping volatile oils, gasoline and other products.

Bridge News

Paducah, Ky., is considering the construction of a steel or reinforced concrete viaduct over the Illinois Central tracks at Fourteenth street. Address Mayor Thomas N. Hazelip.

The Niagara, St. Catherines & Toronto Railway Co. will replace the timber trestle at Ten Mile creek, near St. Catherines, Ont., with a steel swing bridge.

The McCracken fiscal court, Paducah, Ky., has decided to do its own bridge work, and is in the market for a carload of steel to be used for this purpose.

The British Columbia government will immediately proceed with the erection of a bridge over the Upper Nachacho river in addition to a large steel bridge to be constructed by the Grand Trunk Pacific.

The city of Lexington, Ky., is planning the construction of two viaducts, one from Main to High street and the other on West Main street, beginning at Cox. Address Mayor Cassidy.

Four large bridges with concrete sub-structures and steel super-structures of steel, are being built by the Canadian Northern railroad between Montreal, Que., and Pembroke, Ont., at a total cost of $1,250,000. They are being constructed over the Back river, the Mille Illes and across the Ottawa river at Chats Falls and Portage du Fort. The Back river bridge is 1,400 feet in length; the Mille Illes one about twice that length. The Chats Falls and Portage du Fort bridges are 1,800 and 1,300 feet long, respectively.

Miscellaneous

The Gulf Refining Co., Somerville, Mass., is to erect 10 tanks with a total storage capacity of 200,000 gallons of petroleum products.

The plant of the Southwestern Iron Works, Guthrie, Okla., which recently failed for $110,000, will be sold soon at public auction.

Liabilities are placed at $203,366.41 and assets at $158,866.02 in schedules of the Streator Motor Car Co., Streator, Ill., recently filed.

The Cleveland Crane & Engineering Co., Wickliffe, O., has taken an order for two 15-ton bucket and magnet handling cranes with 85-foot spans to be installed in the Edgar Thomson works of the Carnegie Steel Co.

The Bland-Cambria Coal Co., Altoona, Pa., has taken over the Plack coal fields at Dougherty's mines, according to reports from Altoona. William H. Byers, of New York, is at the head of the Bland-Cambria Co.

The Borden Stove Co., Philadelphia, successor to F. M. Borden & Bro., advises that it is not engaged in the manufacture of stoves, ranges and refrigerators, but distributes them in a wholesale way. Officers are: President, F. M. Borden; vice president, J. B. Borden; secretary, A. E. Koch; treasurer, J. B. Smyth.

The citizens of Fort William, Ont., on Jan. 6 adopted by-laws guaranteeing to the amount of $250,000 the bonds of the Maritime Nail Co., which will establish a wire and wire nail manufacturing plant, granting a bonus of $50,000 to the Canadian Steel Foundries Co., which will build a plant to cost $250,000; and appropriating $140,000 for an extension of the street railway system.

The supreme court of Wisconsin has dissolved the injunction against the city of Milwaukee, prohibiting it from constructing, maintaining and operating a municipal lighting plant, and the Milwaukee administration is now making preparations for carrying out the original intention of adding equipment to the new garbage incinerating plant for the use of the steam for producing electric current, the idea being to develop this into a municipal lighting plant of sufficient capacity to meet all demands from residents. G. A. Bading is mayor and F. G. Simmons is commissioner of public works.

Trade Notes

The Cutler-Hammer Mfg. Co. has removed its Boston office from 176 Federal street to larger quarters in the new Columbian Life building.

According to reports from Johnstown, Pa., C. B. Letenberger is now in charge of the W. E. Smith machine shop, that city.

The Portsmouth Steel Co., Portsmouth, O., has moved its general office from the plant to the seventh floor of the First National Bank building, recently completed.

The St. Louis Tool Co., St. Louis, writes that it has moved to 2607-09 South Broadway street, and would be pleased to receive catalogs of all appliances used in a machine tool manufacturing plant in order to complete a new catalog file.

Fires

Fire did damage estimated at $1,500 at the plant of the Port Washington Brass Works, Port Washington, Wis., recently.

The Baltimore warehouse of the Carnegie Steel Co. was damaged by fire recently. The loss is estimated at $10,000, covered by insurance.

The buildings and contents of the Morrison Iron Co., of Norwalk, O., were recently destroyed by fire, entailing a $50,000 loss, partly covered by insurance.

The factory of the William A. Murray Spring Mfg. Co., Covington, Ky., was damaged by fire recently, the loss being $25,000. The prospects favor rebuilding.

The pattern room of the Vulcan Iron Works, West Colfax and Osage streets, Denver, was seriously damaged by fire recently, the loss being estimated at $4,000.